Universidad Zaragoza
1542

Trabajo Fin de Grado

ANEXOS

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Escuela de arquitectura e ingeniería
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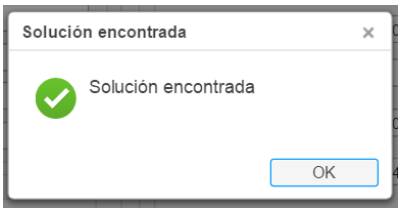
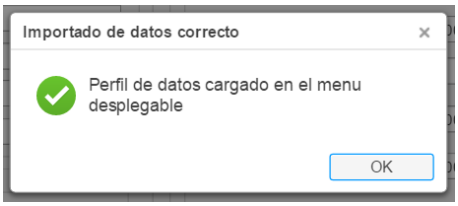
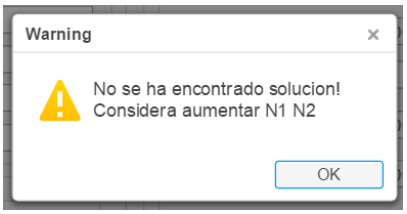
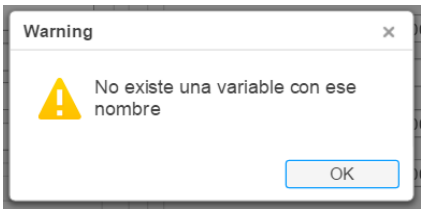
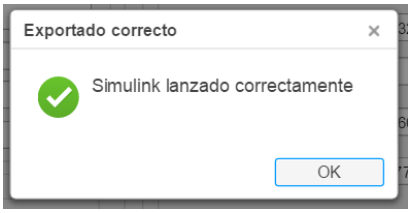
A.1 Tablas: mensajes de confirmación y error

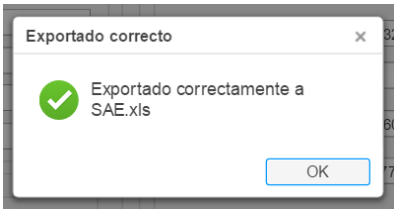


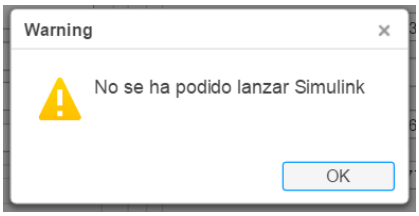


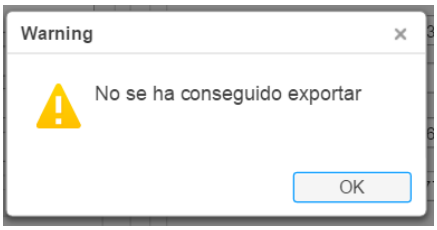


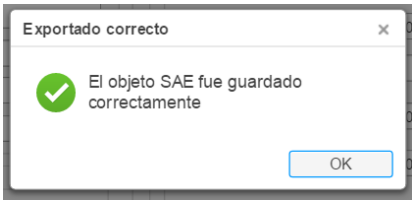


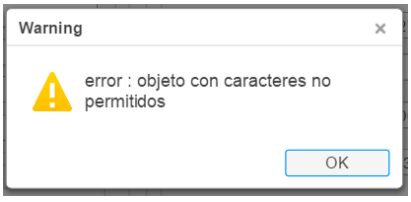












A.2 Fichero : SistemasWPT.mlapp

```
classdef SistemasWPT < matlab.apps.AppBase

    % Properties that correspond to app components
    properties (Access = public)
        DiseadordesistemasWPTUIFigure   matlab.ui.Figure
        TabGroup                        matlab.ui.container.TabGroup
        DiseoTab                        matlab.ui.container.Tab
        CalcularyguardarparmetrosButton  matlab.ui.control.Button
        ExportaraxlsButton              matlab.ui.control.Button
        SolucinptimaPanel               matlab.ui.container.Panel
        DatosGeneralesPanel             matlab.ui.container.Panel
        PabsWLabel                      matlab.ui.control.Label
        PabsWEditField                  matlab.ui.control.NumericEditField
        PcargaWLabel                    matlab.ui.control.Label
        PcargaWEditField                matlab.ui.control.NumericEditField
        densiI2Amm2Label                matlab.ui.control.Label
        densiI2Amm2EditField            matlab.ui.control.NumericEditField
        RendimientoEditFieldLabel       matlab.ui.control.Label
        RendimientoEditField            matlab.ui.control.NumericEditField
        N1EditFieldLabel                matlab.ui.control.Label
        N1EditField                     matlab.ui.control.NumericEditField
        N2EditFieldLabel                matlab.ui.control.Label
        N2EditField                     matlab.ui.control.NumericEditField
        FrecuenciaHzEditFieldLabel      matlab.ui.control.Label
        FrecuenciaHzEditField           matlab.ui.control.NumericEditField
        L1HEditFieldLabel               matlab.ui.control.Label
        L1HEditField                    matlab.ui.control.NumericEditField
        L2HEditFieldLabel               matlab.ui.control.Label
        L2HEditField                    matlab.ui.control.NumericEditField
        MHEditFieldLabel                matlab.ui.control.Label
        MHEditField                     matlab.ui.control.NumericEditField
        S1mm2EditFieldLabel             matlab.ui.control.Label
        S1mm2EditField                  matlab.ui.control.NumericEditField
        S2mm2EditFieldLabel             matlab.ui.control.Label
        S2mm2EditField                  matlab.ui.control.NumericEditField
        I1AEditFieldLabel               matlab.ui.control.Label
        I1AEditField                    matlab.ui.control.NumericEditField
        I2AEditFieldLabel               matlab.ui.control.Label
        I2AEditField                    matlab.ui.control.NumericEditField
        R2OmEditFieldLabel              matlab.ui.control.Label
        R2OmEditField                   matlab.ui.control.NumericEditField
        R1OmLabel                       matlab.ui.control.Label
        R1OmEditField                   matlab.ui.control.NumericEditField
```

```
        densiI1Amm2Label                matlab.ui.control.Label
        densiI1Amm2EditField            matlab.ui.control.NumericEditField
        IpALabel                        matlab.ui.control.Label
        IpAEditField                  matlab.ui.control.NumericEditField
CondensadoresybobinasdecompensacionPanel  matlab.ui.container.Panel
        C1FEditFieldLabel               matlab.ui.control.Label
        C1FEditField                    matlab.ui.control.NumericEditField
        C2FEditFieldLabel               matlab.ui.control.Label
        C2FEditField                    matlab.ui.control.NumericEditField
        C3FEditFieldLabel               matlab.ui.control.Label
        C3FEditField                    matlab.ui.control.NumericEditField
        VC1VEditFieldLabel              matlab.ui.control.Label
        VC1VEditField                   matlab.ui.control.NumericEditField
        VC2VEditFieldLabel              matlab.ui.control.Label
        VC2VEditField                   matlab.ui.control.NumericEditField
        VC3VEditFieldLabel              matlab.ui.control.Label
        VC3VEditField                   matlab.ui.control.NumericEditField
        VL3VEditFieldLabel              matlab.ui.control.Label
        VL3VEditField                   matlab.ui.control.NumericEditField
        L3HLabel                        matlab.ui.control.Label
        L3HEditField                    matlab.ui.control.NumericEditField
        IC2ALabel                       matlab.ui.control.Label
        IC2AEditField                   matlab.ui.control.NumericEditField
        IC3AEditFieldLabel              matlab.ui.control.Label
        IC3AEditField                   matlab.ui.control.NumericEditField
        IL3AEditFieldLabel              matlab.ui.control.Label
        IL3AEditField                   matlab.ui.control.NumericEditField
        IC1AEditFieldLabel              matlab.ui.control.Label
        IC1AEditField                   matlab.ui.control.NumericEditField
        ParmetrosinicialesPanel         matlab.ui.container.Panel
        PrimarioPanel                   matlab.ui.container.Panel
        maxN1Label                      matlab.ui.control.Label
        maxN1EditField                  matlab.ui.control.NumericEditField
        fmaxHzEditFieldLabel            matlab.ui.control.Label
        fmaxHzEditField                 matlab.ui.control.NumericEditField
        VccVEditFieldLabel              matlab.ui.control.Label
        VccVEditField                   matlab.ui.control.NumericEditField
        V1VEditFieldLabel               matlab.ui.control.Label
        V1VEditField                    matlab.ui.control.NumericEditField
        DensiI1Amm2EditFieldLabel       matlab.ui.control.Label
        DensiI1Amm2EditField            matlab.ui.control.NumericEditField
        GeomtricosPanel                 matlab.ui.container.Panel
        a1mEditFieldLabel               matlab.ui.control.Label
        a1mEditField                    matlab.ui.control.NumericEditField
        b1mEditFieldLabel               matlab.ui.control.Label
        b1mEditField                    matlab.ui.control.NumericEditField
        a2mEditFieldLabel               matlab.ui.control.Label
        a2mEditField                    matlab.ui.control.NumericEditField
```

```
b2mEditFieldLabel                matlab.ui.control.Label
b2mEditField                     matlab.ui.control.NumericEditField
emEditFieldLabel                 matlab.ui.control.Label
emEditField                      matlab.ui.control.NumericEditField
hmEditFieldLabel                 matlab.ui.control.Label
hmEditField                      matlab.ui.control.NumericEditField
Button                           matlab.ui.control.Button
cmEditFieldLabel                 matlab.ui.control.Label
cmEditField                      matlab.ui.control.NumericEditField
BobinasrectangularesLabel        matlab.ui.control.Label
SecundarioPanel                  matlab.ui.container.Panel
DensiI2Amm2EditFieldLabel        matlab.ui.control.Label
DensiI2Amm2EditField             matlab.ui.control.NumericEditField
VbateraVEditFieldLabel           matlab.ui.control.Label
VbateraVEditField                matlab.ui.control.NumericEditField
maxN2EditFieldLabel              matlab.ui.control.Label
maxN2EditField                   matlab.ui.control.NumericEditField
PdeseadaWEditFieldLabel          matlab.ui.control.Label
PdeseadaWEditField               matlab.ui.control.NumericEditField
GeomtricosPanel_2                matlab.ui.container.Panel
hmEditField_2Label               matlab.ui.control.Label
hmEditField_2                    matlab.ui.control.NumericEditField
Button_2                         matlab.ui.control.Button
r2mLabel                         matlab.ui.control.Label
r2mEditField_2                   matlab.ui.control.NumericEditField
r1mLabel                         matlab.ui.control.Label
r1mEditField_2                   matlab.ui.control.NumericEditField
BobinascircularesLabel           matlab.ui.control.Label
TopologiadeCompensacinButtonGroup  matlab.ui.container.ButtonGroup
CompensacinLabel                 matlab.ui.control.Label
KCFactorEditFieldLabel           matlab.ui.control.Label
KCFactorEditField                matlab.ui.control.NumericEditField
LimpiarButton_2                  matlab.ui.control.Button
ExportaraSimulinkButton          matlab.ui.control.Button
CargarperfilButton               matlab.ui.control.Button
StopButton                       matlab.ui.control.Button
ExportaraWorkspaceButton         matlab.ui.control.Button
ImportardesdeWokspceButton       matlab.ui.control.Button
SelectordePerfilesPanel          matlab.ui.container.Panel
NombredelPerfilEditFieldLabel    matlab.ui.control.Label
NombredelPerfilEditField         matlab.ui.control.EditField
PerfilesguardadosDropDownLabel   matlab.ui.control.Label
PerfilesguardadosDropDown        matlab.ui.control.DropDown
imageButton                      matlab.ui.control.StateButton
GrficasvariacinparmetrosTab      matlab.ui.container.Tab
UIAxes                           matlab.ui.control.UIAxes
UIAxes2                          matlab.ui.control.UIAxes
UIAxes3                          matlab.ui.control.UIAxes
```

```
        UIAxes_2                        matlab.ui.control.UIAxes
        UIAxes2_2                       matlab.ui.control.UIAxes
        UIAxes3_2                       matlab.ui.control.UIAxes
        UIAxes_3                        matlab.ui.control.UIAxes
        UIAxes2_3                       matlab.ui.control.UIAxes
        UIAxes3_3                       matlab.ui.control.UIAxes
        UIAxes4                         matlab.ui.control.UIAxes
        UIAxes4_2                       matlab.ui.control.UIAxes
        UIAxes4_3                       matlab.ui.control.UIAxes
        AnlisiscomparativoTab           matlab.ui.container.Tab
        UIAxes5                         matlab.ui.control.UIAxes
        RepresentarButton_2             matlab.ui.control.Button
        AnlisisComparativoLabel         matlab.ui.control.Label
        LimpiarButton                   matlab.ui.control.Button
        EjedeordenadasizquierdoPanel    matlab.ui.container.Panel
        Perfil1DropDownLabel            matlab.ui.control.Label
        Perfil1DropDown                 matlab.ui.control.DropDown
        DatosdelPerfil1DropDownLabel    matlab.ui.control.Label
        DatosdelPerfil1DropDown         matlab.ui.control.DropDown
        EjedeordenadasderechoPanel      matlab.ui.container.Panel
        Perfil2Label                    matlab.ui.control.Label
        Perfil2DropDown                 matlab.ui.control.DropDown
        DatosdelPerfil2DropDownLabel    matlab.ui.control.Label
        DatosdelPerfil2DropDown         matlab.ui.control.DropDown
        EjedeabcisasPanel               matlab.ui.container.Panel
        DatosEjedeabcisasDropDownLabel  matlab.ui.control.Label
        DatosEjedeabcisasDropDown       matlab.ui.control.DropDown
        RepresentarenunanuevaventanaButton  matlab.ui.control.Button
    end


    properties (Access = public)

        Vcc;
        Vbat;
        V1;
        fmax;
        maxN1;
        maxN2;
        Pdeseada;
        Vdeseada;

        %Parámetros geométricos
        h;
        a1;
        b1;
        a2;
        b2;
```

```
        c;
        e;

        KC; %parámetro que define la relación entre condensadores sps ps
        densi1;
        densi2;
        Pcarga;
        indanterior=1000;
        objc;% datos y graficas en activo
        Almobjc=CompG.empty(0);%vector donde se guardan los objetos
        ind1=1;
        Nomb=string.empty(0);;%vector donde se guardan los nombres
        stop=false;
        lastcase % Description
        r1 % Description
        r2 % Description
        % Description
        ventana % Description
    end

    properties (Access = private)
    end

    methods (Access = private)

        function  upparameters(app)
            app.Vbat= app.VbateraVEditField.Value;
            app.KC= app.KCFactorEditField.Value;
            app.densi1= app.DensiI1Amm2EditField.Value;
            app.densi2= app.DensiI2Amm2EditField.Value;
            app.h= app.hmEditField.Value;
            app.maxN1= app.maxN1EditField.Value;
            app.maxN2= app.maxN2EditField.Value;
            app.Pdeseada= app.PdeseadaWEditField.Value;
            app.Vdeseada= app.VbateraVEditField.Value;
            app.fmax=app.fmaxHzEditField.Value;

            app.maxN1= app.maxN1EditField.Value;
            app.maxN2= app.maxN2EditField.Value;
            app.Pdeseada= app.PdeseadaWEditField.Value;
            app.Vdeseada= app.VbateraVEditField.Value;
            app.fmax=app.fmaxHzEditField.Value;
            if isequal(app.lastcase,'rec')
                app.a1 = app.a1mEditField.Value;
                app.a2 = app.a2mEditField.Value;
                app.b1 = app.b1mEditField.Value;
                app.b2 = app.b2mEditField.Value;
                app.h= app.hmEditField.Value;
```

```
            if app.a1~=0 && app.a2~=0 && app.b1~=0 && app.b2~=0
                app.c=-(app.a1-app.a2)/2;
                app.e=(app.b1-app.b2)/2;
                app.cmEditField.Value=app.c;
                app.emEditField.Value=app.e;

            end
        else
            app.r1 = app.r1mEditField_2.Value;
            app.r2 = app.r2mEditField_2.Value;
            app.h= app.hmEditField_2.Value;
        end
        app.Vcc = app.VccVEditField.Value;
        app.V1=2*sqrt(2)*app.Vcc/pi();
        app.V1VEditField.Value=app.V1;

    end

    function Keepandrefress(app)%actualiza los valores de los drpdown
cuando introduciomos datos
        %Guardado en el vector
        app.Nomb(app.ind1)=app.NombredelPerfilEditField.Value;
        app.Almobjc(app.ind1)=app.objc;
        app.ind1=app.ind1+1;

        %Actualizar todos los dropdwon con nombres de perfil
        stringaux=cellstr(app.PerfilesguardadosDropDown.Items);
          app.PerfilesguardadosDropDown.Items=
          [stringaux,app.NombredelPerfilEditField.Value];
        app.Perfil1DropDown.Items=
        [stringaux,app.NombredelPerfilEditField.Value];
        app.Perfil2DropDown.Items=
        [stringaux,app.NombredelPerfilEditField.Value];

        %Cambia el valor que aparece en el dropdown
        app.PerfilesguardadosDropDown.Value=
        app.NombredelPerfilEditField.Value;


    end


    function Loadolddata(app,Scobjc)

        %Datos de entrada
        app.VccVEditField.Value = Scobjc.Vcc;
        app.hmEditField.Value = Scobjc.Vcc;
        app.V1VEditField.Value =Scobjc.V1 ;
```

```
        app.KCFactorEditField.Value = Scobjc.KC;
        app.CompensacinLabel.Text=Scobjc.Comtype;

        app.DensiI1Amm2EditField.Value = Scobjc.densi1;
        app.DensiI2Amm2EditField.Value = Scobjc.densi2;

        app.maxN1EditField.Value = Scobjc.maxN1;
        app.maxN2EditField.Value =Scobjc.maxN2;
        app.PdeseadaWEditField.Value = Scobjc.Pdeseada;
        app.fmaxHzEditField.Value = Scobjc.fmax;
        if isequal(Scobjc.Gtype,'rec')
            app.a2mEditField.Value = Scobjc.a2;
            app.b1mEditField.Value = Scobjc.b1;
            app.b2mEditField.Value = Scobjc.b2;
            app.a1mEditField.Value = Scobjc.a1;
            app.emEditField.Value = Scobjc.e;
            app.cmEditField.Value = Scobjc.c;
            app.hmEditField.Value = Scobjc.h;
        else
            app.r1mEditField_2.Value = Scobjc.r1;
            app.r2mEditField_2.Value = Scobjc.r2;
            app.hmEditField_2.Value = Scobjc.h;
        end
        %Datos de las soluciones

        WriteSol(app,Scobjc)

    end

    function Cleandata(app,a)
        app.indanterior=0;%la ponemos a 0 para que en la siguiente
        salte la ventana de plot

        %como a veces los quitamos nos aseguramos que esten
        app.IC3AEditField.Enable='on';
        app.VC3VEditField.Enable='on';
        app.C3FEditField.Enable='on';
        app.IC1AEditField.Enable='on';
        app.VC1VEditField.Enable='on';
        app.C1FEditField.Enable='on';

        app.VccVEditField.Value = a;
        app.hmEditField.Value =a;
        app.V1VEditField.Value =a ;
        app.KCFactorEditField.Value =a;
        app.DensiI1Amm2EditField.Value = a;
        app.DensiI2Amm2EditField.Value = a;
        app.hmEditField.Value = a;
```

```
        app.maxN1EditField.Value = a;
        app.maxN2EditField.Value =a;
        app.PdeseadaWEditField.Value = a;
        app.fmaxHzEditField.Value = a;
        app.a2mEditField.Value = a;
        app.b1mEditField.Value = a;
        app.b2mEditField.Value = a;
        app.a1mEditField.Value = a;
        app.emEditField.Value = a;
        app.cmEditField.Value = a;
        %Datos de las soluciones
        app.N1EditField.Value=a;
        app.N2EditField.Value=a;
        app.FrecuenciaHzEditField.Value=a;
        app.densiI1Amm2EditField.Value=a;
        app.densiI2Amm2EditField.Value=a;
        app.MHEditField.Value=a;
        app.S1mm2EditField.Value=a;
        app.S2mm2EditField.Value=a;
        app.L1HEditField.Value=a;
        app.L2HEditField.Value=a;
        app.L3HEditField.Value=a;
        app.I1AEditField.Value=a;
        app.I2AEditField.Value=a;
        app.IC1AEditField.Value=a;
        app.IC2AEditField.Value=a;
        app.IC3AEditField.Value=a;
        app.IL3AEditField.Value=a;
        app.VC1VEditField.Value=a;
        app.VC2VEditField.Value=a;
        app.VC3VEditField.Value=a;
        app.VL3VEditField.Value=a;
        app.PabsWEditField.Value=a;
        app.PcargaWEditField.Value=a;
        app.RendimientoEditField.Value=a;
        app.C1FEditField.Value=a;
        app.C2FEditField.Value=a;
        app.C3FEditField.Value=a;



    end
    function Plotgroup(app,Scobjc)
        app.RepresentarButton_2.Enable='on';%cuando existen graficas
        grupales tambien activamos las indv
        if isequal(Scobjc.Gtype,'rec')
```

```
plot(app.UIAxes,Scobjc.distancia,Scobjc.modI1_distancia)
hold(app.UIAxes,'on')
plot(app.UIAxes,Scobjc.distancia,Scobjc.modI2_distancia)
legend(app.UIAxes,{'I1[A]', 'I2[A]'},'Location','best')
xlabel(app.UIAxes,'airgap[m]')
ylabel(app.UIAxes,'I[A]')
yyaxis(app.UIAxes_2,'left')
plot(app.UIAxes_2,Scobjc.distancia,
  Scobjc.Argumentoredondeado_distancia)
hold(app.UIAxes_2,'on')
ylabel(app.UIAxes_2,'Argument[degree]')
yyaxis(app.UIAxes_2,'right')
plot(app.UIAxes_2,Scobjc.distancia,Scobjc.VL_distancia)
%legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
xlabel(app.UIAxes_2,'airgap[m]')
ylabel(app.UIAxes_2,'VL[V]')
%
yyaxis(app.UIAxes_3,'left')
plot(app.UIAxes_3,Scobjc.distancia,Scobjc.PL_distancia)
hold(app.UIAxes_3,'on')
plot(app.UIAxes_3,Scobjc.distancia,Scobjc.P1_distancia)
ylabel(app.UIAxes_3,'P[W]')
legend(app.UIAxes_3,{'PL[W]', 'P1[W]'},'Location','best')
yyaxis(app.UIAxes_3,'right')
plot(app.UIAxes_3,Scobjc.distancia,Scobjc.rend_distancia)
%legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
xlabel(app.UIAxes_3,'airgap[m]')
ylabel(app.UIAxes_3,'Efficiency[%]')
%
plot(app.UIAxes2,Scobjc.f,Scobjc.modI1_freq)
hold(app.UIAxes2,'on')
plot(app.UIAxes2,Scobjc.f,Scobjc.modI2_freq)
legend(app.UIAxes2,{'I1[A]', 'I2[A]'},'Location','best')
xlabel(app.UIAxes2,'frequency[Hz]')
ylabel(app.UIAxes2,'I[A]')
yyaxis(app.UIAxes2_2,'left')
plot(app.UIAxes2_2,Scobjc.f,
    Scobjc.A2rgumentoredondeado_freq)
hold(app.UIAxes2_2,'on')
ylabel(app.UIAxes2_2,'Argument[degree]')
yyaxis(app.UIAxes2_2,'right')
plot(app.UIAxes2_2,Scobjc.f,Scobjc.VL_freq)
%legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
xlabel(app.UIAxes2_2,'frequency[Hz]')
ylabel(app.UIAxes2_2,'VL[V]')
%
yyaxis(app.UIAxes2_3,'left')
plot(app.UIAxes2_3,Scobjc.f,Scobjc.PL_freq)
```

```
 hold(app.UIAxes2_3,'on')
 plot(app.UIAxes2_3,Scobjc.f,Scobjc.P1_freq)
 ylabel(app.UIAxes2_3,'P[W]')
legend(app.UIAxes2_3,{'PL[W]', 'P1[W]'},'Location','best')
 yyaxis(app.UIAxes2_3,'right')
 plot(app.UIAxes2_3,Scobjc.f,Scobjc.rend_freq)
 %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
 xlabel(app.UIAxes2_3,'frequency[Hz]')
 ylabel(app.UIAxes2_3,'Efficiency[%]')
 plot(app.UIAxes3,Scobjc.posyrelativa,Scobjc.modI1_pos)
 hold(app.UIAxes3,'on')
 plot(app.UIAxes3,Scobjc.posyrelativa,Scobjc.modI2_pos)
 legend(app.UIAxes3,{'I1[A]', 'I2[A]'},'Location','best')
 xlabel(app.UIAxes3,'misalignment[%]')
 ylabel(app.UIAxes3,'I[A]')
 %
 yyaxis(app.UIAxes3_2,'left')
 plot(app.UIAxes3_2,Scobjc.posyrelativa,
      Scobjc.A2rgumentoredondeado_pos)
 hold(app.UIAxes3_2,'on')
 ylabel(app.UIAxes3_2,'Argument[degree]')
 yyaxis(app.UIAxes3_2,'right')
 plot(app.UIAxes3_2,Scobjc.posyrelativa,Scobjc.VL_pos)
 %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
 xlabel(app.UIAxes3_2,'misalignment[%]')
 ylabel(app.UIAxes3_2,'VL[V]')
 %
 yyaxis(app.UIAxes3_3,'left')
 plot(app.UIAxes3_3,Scobjc.posyrelativa,Scobjc.PL_pos)
 hold(app.UIAxes3_3,'on')
 plot(app.UIAxes3_3,Scobjc.posyrelativa,Scobjc.P1_pos)
 ylabel(app.UIAxes3_3,'P[W]')
 legend(app.UIAxes3_3,{'PL[W]',
        'P1[W]'},'Location','best')
 yyaxis(app.UIAxes3_3,'right')
 plot(app.UIAxes3_3,Scobjc.posyrelativa,Scobjc.rend_pos)
 %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
 xlabel(app.UIAxes3_3,'misalignment[%]')
 ylabel(app.UIAxes3_3,'Efficiency[%]')
plot(app.UIAxes4,Scobjc.variacioncarga,Scobjc.modI1_carga)
 hold(app.UIAxes4,'on')
plot(app.UIAxes4,Scobjc.variacioncarga,Scobjc.modI2_carga)
 legend(app.UIAxes4,{'I1[A]', 'I2[A]'},'Location','best')
 xlabel(app.UIAxes4,'R de carga/Rnominal')
 ylabel(app.UIAxes4,'I[A]')

 %
 yyaxis(app.UIAxes4_2,'left')
```

```
        plot(app.UIAxes4_2,Scobjc.variacioncarga,
            Scobjc.A2rgumentoredondeado_carga)
        hold(app.UIAxes4_2,'on')
        ylabel(app.UIAxes4_2,'Argument[degree]')
        yyaxis(app.UIAxes4_2,'right')
        plot(app.UIAxes4_2,Scobjc.variacioncarga,Scobjc.VL_carga)
        %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
        xlabel(app.UIAxes4_2,'R de carga/Rnominal')
        ylabel(app.UIAxes4_2,'VL[V]')
        yyaxis(app.UIAxes4_3,'left')
        plot(app.UIAxes4_3,Scobjc.variacioncarga,Scobjc.PL_carga)
        hold(app.UIAxes4_3,'on')
        plot(app.UIAxes4_3,Scobjc.variacioncarga,Scobjc.P1_carga)
        ylabel(app.UIAxes4_3,'P[W]')
        legend(app.UIAxes4_3,{'PL[W]',
               'P1[W]'},'Location','best')
        yyaxis(app.UIAxes4_3,'right')
      plot(app.UIAxes4_3,Scobjc.variacioncarga,Scobjc.rend_carga)
        %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
        xlabel(app.UIAxes4_3,'R de carga/Rnominal')
        ylabel(app.UIAxes4_3,'Efficiency[%]')
    else
        if isequal(Scobjc.Gtype,'cir')
            %
         plot(app.UIAxes,Scobjc.distancia,Scobjc.modI1_distancia)
            hold(app.UIAxes,'on')
         plot(app.UIAxes,Scobjc.distancia,Scobjc.modI2_distancia)
            legend(app.UIAxes,{'I1[A]',
                'I2[A]'},'Location','best')
            xlabel(app.UIAxes,'airgap[m]')
            ylabel(app.UIAxes,'I[A]')

            %
            yyaxis(app.UIAxes_2,'left')
            plot(app.UIAxes_2,Scobjc.distancia,
          Scobjc.Argumentoredondeado_distancia)
            hold(app.UIAxes_2,'on')
            ylabel(app.UIAxes_2,'Argument[degree]')
            yyaxis(app.UIAxes_2,'right')
            plot(app.UIAxes_2,Scobjc.distancia,
                   Scobjc.VL_distancia)
            %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
            xlabel(app.UIAxes_2,'airgap[m]')
            ylabel(app.UIAxes_2,'VL[V]')
            yyaxis(app.UIAxes_3,'left')
            plot(app.UIAxes_3,
          Scobjc.distancia,Scobjc.PL_distancia)
            hold(app.UIAxes_3,'on')
```

```
plot(app.UIAxes_3,Scobjc.distancia,
       Scobjc.P1_distancia)
ylabel(app.UIAxes_3,'P[W]')
legend(app.UIAxes_3,{'PL[W]',
    'P1[W]'},'Location','best')
yyaxis(app.UIAxes_3,'right')
plot(app.UIAxes_3,Scobjc.distancia,
      Scobjc.rend_distancia)
xlabel(app.UIAxes_3,'airgap[m]')
ylabel(app.UIAxes_3,'Efficiency[%]')
%
plot(app.UIAxes2,Scobjc.f,Scobjc.modI1_freq)
hold(app.UIAxes2,'on')
plot(app.UIAxes2,Scobjc.f,Scobjc.modI2_freq)
legend(app.UIAxes2,{'I1[A]',
    'I2[A]'},'Location','best')
xlabel(app.UIAxes2,'frequency[Hz]')
ylabel(app.UIAxes2,'I[A]')

%
yyaxis(app.UIAxes2_2,'left')
plot(app.UIAxes2_2,Scobjc.f,
 Scobjc.A2rgumentoredondeado_freq)
hold(app.UIAxes2_2,'on')
ylabel(app.UIAxes2_2,'Argument[degree]')
yyaxis(app.UIAxes2_2,'right')
plot(app.UIAxes2_2,Scobjc.f,Scobjc.VL_freq)
xlabel(app.UIAxes2_2,'frequency[Hz]')
ylabel(app.UIAxes2_2,'VL[V]')
%
yyaxis(app.UIAxes2_3,'left')
plot(app.UIAxes2_3,Scobjc.f,Scobjc.PL_freq)
hold(app.UIAxes2_3,'on')
plot(app.UIAxes2_3,Scobjc.f,Scobjc.P1_freq)
ylabel(app.UIAxes2_3,'P[W]')
legend(app.UIAxes2_3,{'PL[W]',
    'P1[W]'},'Location','best')
yyaxis(app.UIAxes2_3,'right')
plot(app.UIAxes2_3,Scobjc.f,Scobjc.rend_freq)
xlabel(app.UIAxes2_3,'frequency[Hz]')
ylabel(app.UIAxes2_3,'Efficiency[%]')
plot(app.UIAxes4,Scobjc.variacioncarga,
       Scobjc.modI1_carga)
hold(app.UIAxes4,'on')
plot(app.UIAxes4,Scobjc.variacioncarga,S
        cobjc.modI2_carga)
legend(app.UIAxes4,{'I1[A]',
    'I2[A]'},'Location','best')
```

```
                xlabel(app.UIAxes4,'R de carga/Rnominal')
                ylabel(app.UIAxes4,'I[A]')

                %
                yyaxis(app.UIAxes4_2,'left')
                plot(app.UIAxes4_2,Scobjc.variacioncarga,
                Scobjc.A2rgumentoredondeado_carga)
                hold(app.UIAxes4_2,'on')
                ylabel(app.UIAxes4_2,'Argument[degree]')
                yyaxis(app.UIAxes4_2,'right')
                plot(app.UIAxes4_2,Scobjc.variacioncarga,
                        Scobjc.VL_carga)
                %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
                xlabel(app.UIAxes4_2,'R de carga/Rnominal')
                ylabel(app.UIAxes4_2,'VL[V]')
                %
                yyaxis(app.UIAxes4_3,'left')
                plot(app.UIAxes4_3,Scobjc.variacioncarga,
                        Scobjc.PL_carga)
                hold(app.UIAxes4_3,'on')
                plot(app.UIAxes4_3,Scobjc.variacioncarga,
                        Scobjc.P1_carga)
                ylabel(app.UIAxes4_3,'P[W]')
                legend(app.UIAxes4_3,{'PL[W]',
                   'P1[W]'},'Location','best')
                yyaxis(app.UIAxes4_3,'right')
                plot(app.UIAxes4_3,Scobjc.variacioncarga,
                       Scobjc.rend_carga)
                %legend(app.UIAxes_2,{'Arg', 'VL'},'Location','best')
                xlabel(app.UIAxes4_3,'R de carga/Rnominal')
                ylabel(app.UIAxes4_3,'Efficiency[%]')
                %
            end

        end

    end

    function results = Findindexgru(app)
        value = app.PerfilesguardadosDropDown.Value;
        %bucle buscar índice
        i=1;
        for a=app.Nomb

            if value== a
                results=i;
            end
            i=i+1;
```

```
        end

    end

    function Formatplots(app)


        cla(app.UIAxes,'reset')
        cla(app.UIAxes_2,'reset');
        cla(app.UIAxes_3,'reset');
        cla(app.UIAxes2,'reset');
        cla(app.UIAxes2_2,'reset');
        cla(app.UIAxes2_3,'reset');
        cla(app.UIAxes3,'reset');
        cla(app.UIAxes3_2,'reset');
        cla(app.UIAxes3_3,'reset');
        cla(app.UIAxes4,'reset');
        cla(app.UIAxes4_2,'reset');
        cla(app.UIAxes4_3,'reset');

        %borramos lado derecho
        app.UIAxes.XMinorGrid =     'on';
        app.UIAxes_2.XMinorGrid =     'on' ;
        app.UIAxes_3.XMinorGrid =     'on' ;
        app.UIAxes2.XMinorGrid =     'on' ;
        app.UIAxes2_2.XMinorGrid =     'on' ;
        app.UIAxes2_3.XMinorGrid=     'on' ;
        app.UIAxes3.XMinorGrid =     'on' ;
        app.UIAxes3_2.XMinorGrid =     'on' ;
        app.UIAxes3_3.XMinorGrid =     'on' ;
        app.UIAxes4.XMinorGrid =     'on' ;
        app.UIAxes4_2.XMinorGrid =     'on' ;
        app.UIAxes4_3.XMinorGrid =     'on' ;

        app.UIAxes.YMinorGrid =     'on' ;
        app.UIAxes_2.YMinorGrid =     'on' ;
        app.UIAxes_3.YMinorGrid =     'on' ;
        app.UIAxes2.YMinorGrid =     'on' ;
        app.UIAxes2_2.YMinorGrid =     'on' ;
        app.UIAxes2_3.YMinorGrid =     'on' ;
        app.UIAxes3.YMinorGrid =     'on' ;
        app.UIAxes3_2.YMinorGrid =     'on' ;
        app.UIAxes3_3.YMinorGrid =     'on' ;
        app.UIAxes4.YMinorGrid =     'on' ;
        app.UIAxes4_2.YMinorGrid =     'on' ;
        app.UIAxes4_3.YMinorGrid =     'on' ;
```

```
        end

        function results = Findindexind(app,val)

            %bucle buscar indice que corresponda a
            i=1;
            for a=app.Nomb

                if val== a
                    results=i;
                end
                i=i+1;
            end

        end

        function  Plotindv(app ,xstr,sidey,var,ystr,yy) %app string x
                          left right var ystring
            if yy
                yyaxis(app.UIAxes5,sidey)
            end
            ylabel(app.UIAxes5, ystr)
            switch xstr

                case 'airgap[m]'

                    switch ystr
                        case'I1[A]'
                            plot(app.UIAxes5,var.distancia,
                           var.modI1_distancia)
                        case'I2[A]'
                            plot(app.UIAxes5,var.distancia,
                           var.modI2_distancia)
                        case'VL[V]'
                            plot(app.UIAxes5,var.distancia,
                            var.VL_distancia)
                        case'Argument[degree]'
                            plot(app.UIAxes5,var.distancia,
                    var.Argumentoredondeado_distancia)
                        case'PL[W]'

plot(app.UIAxes5,var.distancia,var.PL_distancia)
                        case'Efficiency[%]'
                            plot(app.UIAxes5,var.distancia,
                           var.rend_distancia)
                        case 'P1[W]'
                            plot(app.UIAxes5,var.distancia,
                            var.P1_distancia)
```

```
                case 'Ip[A]'
                    plot(app.UIAxes5,var.distancia,
                   var.modIp_distancia)
                case 'Ic3[A]'
                    plot(app.UIAxes5,var.distancia,
                  var.modIc3_distancia)
                case 'VC1[V]'
                    plot(app.UIAxes5,var.distancia,
                    var.VC1_distancia)
                case 'VC2[V]'
                    plot(app.UIAxes5,var.distancia,
                    var.VC2_distancia)

                otherwise
            end
            %plot(app.UIAxes5,var.distancia,yvar)

            hold(app.UIAxes5,'on')

            xlabel(app.UIAxes5,'airgap[m]')


        case 'frequency[Hz]'

            switch ystr
                case'I1[A]'
                    plot(app.UIAxes5,var.f,var.modI1_freq)
                case'I2[A]'
                    plot(app.UIAxes5,var.f,var.modI2_freq)
                case'VL[V]'
                    plot(app.UIAxes5,var.f,var.VL_freq)
                case'Argument[degree]'
                    plot(app.UIAxes5,var.f,
                     var.A2rgumentoredondeado_freq)
                case'PL[W]'
                    plot(app.UIAxes5,var.f,var.PL_freq)
                case'Efficiency[%]'
                    plot(app.UIAxes5,var.f,var.rend_freq)
                case 'P1[W]'
                    plot(app.UIAxes5,var.f,var.P1_freq)
                case 'Ip[A]'
                    plot(app.UIAxes5,var.f,var.modIp_freq)
                case 'Ic3[A]'
                    plot(app.UIAxes5,var.f,var.modIc3_freq)
                case 'VC1[V]'
                    plot(app.UIAxes5,var.f,var.VC1_freq)
                case 'VC2[V]'
                    plot(app.UIAxes5,var.f,var.VC2_freq)
```

```
            otherwise
        end
        %plot(app.UIAxes5,var.f,yvar)
        hold(app.UIAxes5,'on')
        xlabel(app.UIAxes5,'frequency[Hz]')

    case 'misalignment[%]'

        switch ystr
            case'I1[A]'
                plot(app.UIAxes5,var.posyrelativa,
                  var.modI1_pos)
            case'I2[A]'
                plot(app.UIAxes5,var.posyrelativa,
                  var.modI2_pos)
            case'VL[V]'
                plot(app.UIAxes5,var.posyrelativa,
                    var.VL_pos)
            case'Argument[degree]'
                plot(app.UIAxes5,var.posyrelativa,
                 var.A2rgumentoredondeado_pos)
            case'PL[W]'
                plot(app.UIAxes5,var.posyrelativa,
                    var.PL_pos)
            case'Efficiency[%]'
                plot(app.UIAxes5,var.posyrelativa,
                   var.rend_pos)
            case 'P1[W]'
                plot(app.UIAxes5,var.posyrelativa,
                    var.P1_pos)
            case 'Ip[A]'
                plot(app.UIAxes5,var.posyrelativa,
                  var.modIp_pos)
            case 'Ic3[A]'
                plot(app.UIAxes5,var.posyrelativa,
                 var.modIc3_pos)
            case 'VC1[V]'
                plot(app.UIAxes5,var.posyrelativa,
                   var.VC1_pos)
            case 'VC2[V]'
                plot(app.UIAxes5,var.posyrelativa,
                   var.VC2_pos)

            otherwise
        end
        % plot(app.UIAxes5,var.posyrelativa,yvar)
```

```
            hold(app.UIAxes5,'on')
            xlabel(app.UIAxes5,'misalignment[%]')
        case 'R de carga/Rnominal'

            switch ystr
                case'I1[A]'
                    plot(app.UIAxes5,var.variacioncarga,
                     var.modI1_carga)
                case'I2[A]'
                    plot(app.UIAxes5,var.variacioncarga,
                     var.modI2_carga)
                case'VL[V]'
                    plot(app.UIAxes5,var.variacioncarga,
                       var.VL_carga)
                case'Argument[degree]'
                    plot(app.UIAxes5,var.variacioncarga,
                       var.A2rgumentoredondeado_carga)
                case'PL[W]'
                    plot(app.UIAxes5,var.variacioncarga,
                       var.PL_carga)
                case'Efficiency[%]'
                    plot(app.UIAxes5,var.variacioncarga,
                      var.rend_carga)
                case 'P1[W]'
                    plot(app.UIAxes5,var.variacioncarga,
                       var.P1_carga)
                case 'Ip[A]'
                    plot(app.UIAxes5,var.variacioncarga,
                     var.modIp_carga)
                case 'Ic3[A]'
                    plot(app.UIAxes5,var.variacioncarga,
                     var.modIc3_carga)
                case 'VC1[V]'
                    plot(app.UIAxes5,var.variacioncarga,
                      var.VC1_carga)
                case 'VC2[V]'
                    plot(app.UIAxes5,var.variacioncarga,
                      var.VC2_carga)
                otherwise
            end
            %plot(app.UIAxes5,var.variacioncarga,yvar)
            hold(app.UIAxes5,'on')
            xlabel(app.UIAxes5,'R de carga/Rnominal')

        otherwise
    end
```

```
end

function  WriteSol(app,Sobjc)

    app.IC3AEditField.Enable='on';
    app.VC3VEditField.Enable='on';
    app.C3FEditField.Enable='on';
    app.IC1AEditField.Enable='on';
    app.VC1VEditField.Enable='on';
    app.C1FEditField.Enable='on';
    app.L3HEditField.Enable='on';
    app.VL3VEditField.Enable='on';
    app.IL3AEditField.Enable='on';

    app.CompensacinLabel.Text=Sobjc.Comtype;
    app.N1EditField.Value=Sobjc.opt(1);
    app.N2EditField.Value=Sobjc.opt(2);
    app.FrecuenciaHzEditField.Value=abs(Sobjc.f0(ç
              Sobjc.opt(1),Sobjc.opt(2)));
    app.densiI1Amm2EditField.Value=abs(Sobjc.densiI1(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.densiI2Amm2EditField.Value=abs(Sobjc.densiI2(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.MHEditField.Value=abs(Sobjc.M(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.S1mm2EditField.Value=abs(Sobjc.S1(
             Sobjc.opt(1),Sobjc.opt(2)))*1e6;
    app.S2mm2EditField.Value=abs(Sobjc.S2(
            Sobjc.opt(1),Sobjc.opt(2)))*1e6;
    app.R1OmEditField.Value=abs(Sobjc.R1(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.R2OmEditField.Value=abs(Sobjc.R2(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.L1HEditField.Value=abs(Sobjc.L1(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.L2HEditField.Value=abs(Sobjc.L2(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.L3HEditField.Value=abs(Sobjc.L3(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.I1AEditField.Value=abs(Sobjc.I1(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.I2AEditField.Value=abs(Sobjc.I2(
              Sobjc.opt(1),Sobjc.opt(2)));
    app.IpAEditField.Value=abs(
          Sobjc.Ip(Sobjc.opt(1),Sobjc.opt(2)));

    app.IC2AEditField.Value=abs(
         Sobjc.IC2(Sobjc.opt(1),Sobjc.opt(2)));
```

```
app.IL3AEditField.Value=abs(
      Sobjc.IL3(Sobjc.opt(1),Sobjc.opt(2)));
app.VC2VEditField.Value=abs(
      Sobjc.VC2(Sobjc.opt(1),Sobjc.opt(2)));
app.VL3VEditField.Value=abs(
      Sobjc.VL3(Sobjc.opt(1),Sobjc.opt(2)));

if app.KCFactorEditField.Value ==0 %no hay C3 luego
    app.IC3AEditField.Enable='off';
    app.VC3VEditField.Enable='off';
    app.C3FEditField.Enable='off';
    app.IC3AEditField.Value=0;
    app.VC3VEditField.Value=0;
    app.C3FEditField.Value=0;
    app.L3HEditField.Enable='off';
    app.VL3VEditField.Enable='off';
    app.IL3AEditField.Enable='off';
    app.L3HEditField.Value=0;
    app.VL3VEditField.Value=0;
    app.IL3AEditField.Value=0;
else

    app.IC3AEditField.Value=abs(
      Sobjc.IC3(Sobjc.opt(1),Sobjc.opt(2)));
    app.VC3VEditField.Value=abs(
      Sobjc.VC3(Sobjc.opt(1),Sobjc.opt(2)));
    app.C3FEditField.Value=abs(
       Sobjc.C3(Sobjc.opt(1),Sobjc.opt(2)));
end

if app.KCFactorEditField.Value==1 %No hay C1

    app.IC1AEditField.Enable='off';
    app.VC1VEditField.Enable='off';
    app.C1FEditField.Enable='off';
    app.IC1AEditField.Value=0;
    app.VC1VEditField.Value=0;
    app.C1FEditField.Value=0;
    app.L3HEditField.Enable='off';
    app.VL3VEditField.Enable='off';
    app.IL3AEditField.Enable='off';
    app.L3HEditField.Value=0;
    app.VL3VEditField.Value=0;
    app.IL3AEditField.Value=0;

else

    app.IC1AEditField.Value=abs(
```

```
            Sobjc.IC1(Sobjc.opt(1),Sobjc.opt(2)));
        app.VC1VEditField.Value=abs(
            Sobjc.VC1(Sobjc.opt(1),Sobjc.opt(2)));
        app.C1FEditField.Value=abs(
            Sobjc.C1(Sobjc.opt(1),Sobjc.opt(2)));
    end


    app.PabsWEditField.Value=Sobjc.P1(Sobjc.opt(1),Sobjc.opt(2));
    app.PcargaWEditField.Value=Sobjc.PL(
                Sobjc.opt(1),Sobjc.opt(2));
    app.RendimientoEditField.Value=abs(
         Sobjc.rend(Sobjc.opt(1),Sobjc.opt(2)));
    app.C2FEditField.Value=abs(
          Sobjc.C2(Sobjc.opt(1),Sobjc.opt(2)));
    EnablePlots(app,Sobjc)%en funcion del objeto habilitado
                quitamos o ponemos graficas
end


function DisableEnalbebutton(app,str)%str on or off
    app.CalcularyguardarparmetrosButton.Enable = str;
    app.CargarperfilButton.Enable = str;
    app.LimpiarButton_2.Enable = str;
    app.ExportaraxlsButton.Enable=str;
    app.CargarperfilButton.Enable= str;
    app.ExportaraSimulinkButton.Enable =str;
    app.ExportaraWorkspaceButton.Enable = str;
    app.ImportardesdeWokspceButton.Enable = str;

end

function results = Checkparameter(app,adverten)
    %esta ya el nombre de perfil?
    results= false;

    for a=app.Nomb
        if app.NombredelPerfilEditField.Value==a
            Advertwindow(app,adverten)

            results= true;
            return
        end
    end


end
```

```
        function Advertwindow(app,advert)
            message2 = sprintf(advert);
            uialert(app.DiseadordesistemasWPTUIFigure,
                  message2,'Warning','Icon','warning');
        end

        function  Overwrite(app)
            %Guardado en el vector
            app.Nomb(Findindexgru(app))=
                   app.NombredelPerfilEditField.Value;
            app.Almobjc(Findindexgru(app))=app.objc;

        end

        function  ActualizaKC(app)
            value = app.KCFactorEditField.Value;
            if value==0

                app.CompensacinLabel.Text='SS';
                app.imageButton.Icon='SS.png';
            end

            if value==1
                app.CompensacinLabel.Text='PS';
                app.imageButton.Icon='PS.png';

            end
            if value~=1 && value~=0
                app.CompensacinLabel.Text='SPS';
                app.imageButton.Icon='SPS.png';
            end

        end

        function  ChangeRecCirc(app)
            if isequal(app.lastcase,'cir')
                %si el ultimo caso es geopmetria circulare
                app.lastcase='rec';%cambiamos a rectangulares
                app.GeomtricosPanel.Visible='on';
                app.GeomtricosPanel_2.Visible='off';


            else
                if isequal(app.lastcase,'rec')%si el ultimo caso es
geometria rectangular
                    app.lastcase='cir';%cambiamos a circulares
                    app.GeomtricosPanel.Visible='off';
                    app.GeomtricosPanel_2.Visible='on';
```

```
            end

        end
    end

    function result = CalcRecCirc(app)
        result=CompG;
        if isequal(app.lastcase,'rec')

            result=CoGrec(result,app,app.Vcc,app.Vbat,app.h,
             app.a1,app.b1,app.a2,app.b2,app.fmax,app.densi1,
              app.densi2,app.maxN1,app.maxN2,app.Pdeseada,
               app.Vdeseada,app.KC);

        end
        if  isequal(app.lastcase,'cir')
            result=CoGcir(result,app,app.Vcc,app.Vbat,app.h,
            app.r1,app.r2,app.fmax,app.densi1,app.densi2,app.maxN1,
            app.maxN2,app.Pdeseada,app.Vdeseada,app.KC);

        end

    end



    function EnablePlots(app,Sobjc)
        if isequal(Sobjc.Gtype,'rec')
            app.DatosEjedeabcisasDropDown.Items={'airgap[m]',
                'frequency[Hz]','misalignment[%]',
                     'R de carga/Rnominal'};

        else if isequal(Sobjc.Gtype,'cir')
                app.DatosEjedeabcisasDropDown.Items={'frequency[Hz]',
               'R de carga/Rnominal','airgap[m]'};
            end
        end

    end

    function results = Plottogether(app,str1,str2)

        results=false;

        if isequal(str1,str2)
            results=true;
        end
```

```
if isequal(str1,'I1[A]') && isequal(str2,'I2[A]')
    results=true;
end
if (isequal(str2,'I1[A]') && isequal(str1,'I2[A]'))
    results=true;
end
if  (isequal(str2,'P1[W]') && isequal(str1,'PL[W]'))
    results=true;
end
if  (isequal(str1,'P1[W]') && isequal(str2,'PL[W]'))
    results=true;
end
if  (isequal(str2,'Ip[A]') && isequal(str1,'I1[A]'))
    results=true;
end
if  (isequal(str1,'Ip[A]') && isequal(str2,'I2[A]'))
    results=true;
end

if  (isequal(str2,'Ip[A]') && isequal(str1,'I2[A]'))
    results=true;
end
if  (isequal(str1,'Ip[A]') && isequal(str2,'I1[A]'))
    results=true;
end

if  (isequal(str2,'VC1[V]') && isequal(str1,'VC2[V]'))
    results=true;
end
if  (isequal(str2,'VC2[V]') && isequal(str1,'VC1[V]'))
    results=true;
end

if  (isequal(str1,'Ic3[A]') && isequal(str2,'Ip[A]'))
    results=true;
end
if  (isequal(str2,'Ic3[A]') && isequal(str1,'Ip[A]'))
    results=true;
end
if  (isequal(str2,'Ic3[A]') && isequal(str1,'I1[A]'))
    results=true;
end
if  (isequal(str1,'Ic3[A]') && isequal(str2,'I2[A]'))
    results=true;
end
if  (isequal(str1,'Ic3[A]') && isequal(str2,'I1[A]'))
    results=true;
end
```

```
        if  (isequal(str2,'Ic3[A]') && isequal(str1,'I2[A]'))
            results=true;
        end
        if  (isequal(str2,'VL[V]') && isequal(str1,'VC2[V]'))
            results=true;
        end
        if  (isequal(str2,'VL[V]') && isequal(str1,'VC1[V]'))
            results=true;
        end

        if  (isequal(str2,'VC1[V]') && isequal(str1,'VL[V]'))
            results=true;
        end
        if  (isequal(str2,'VC2[V]') && isequal(str1,'VL[V]'))
            results=true;
        end

    end

    function SetRecCirc(app,obj)
        if isequal(obj.Gtype,'rec') %si el último caso es geometría
          circulare
            app.lastcase='rec';%cambiamos a rectangulares
            app.GeomtricosPanel.Visible='on';
            app.GeomtricosPanel_2.Visible='off';


        else
            if isequal(obj.Gtype,'cir')%si el ultimo caso es
             geometría rectangular
                app.lastcase='cir';%cambiamos a circulares
                app.GeomtricosPanel.Visible='off';
                app.GeomtricosPanel_2.Visible='on';

            end

        end

    end

    function Plotnew(app,axgen,xstr,sidey,var,ystr,yy

        if yy

            yyaxis(axgen,sidey)
            ylabel(axgen, ystr)
        else
            ylabel(axgen, ystr)
```

```
end

switch xstr

    case 'airgap[m]'

        switch ystr
            case'I1[A]'
                plot(axgen,var.distancia,var.modI1_distancia)
            case'I2[A]'
                plot(axgen,var.distancia,var.modI2_distancia)
            case'VL[V]'
                plot(axgen,var.distancia,var.VL_distancia)
            case'Argument[degree]'
                plot(axgen,var.distancia,
                 var.Argumentoredondeado_distancia)
            case'PL[W]'
                plot(axgen,var.distancia,var.PL_distancia)
            case'Efficiency[%]'
                plot(axgen,var.distancia,var.rend_distancia)
            case 'P1[W]'
                plot(axgen,var.distancia,var.P1_distancia)
            case 'Ip[A]'
                plot(axgen,var.distancia,var.modIp_distancia)
            case 'Ic3[A]'
                plot(axgen,var.distancia,
                 var.modIc3_distancia)
            case 'VC1[V]'
                plot(axgen,var.distancia,var.VC1_distancia)
            case 'VC2[V]'
                plot(axgen,var.distancia,var.VC2_distancia)

            otherwise
        end
        %plot(axgen,var.distancia,yvar)

        hold(axgen,'on')

        xlabel(axgen,'airgap[m]')


    case 'frequency[Hz]'

        switch ystr
            case'I1[A]'
                plot(axgen,var.f,var.modI1_freq)
            case'I2[A]'
                plot(axgen,var.f,var.modI2_freq)
```

```
                case'VL[V]'
                    plot(axgen,var.f,var.VL_freq)
                case'Argument[degree]'
                    plot(axgen,var.f,
              var.A2rgumentoredondeado_freq)
                case'PL[W]'
                    plot(axgen,var.f,var.PL_freq)
                case'Efficiency[%]'
                    plot(axgen,var.f,var.rend_freq)
                case 'P1[W]'
                    plot(axgen,var.f,var.P1_freq)
                case 'Ip[A]'
                    plot(axgen,var.f,var.modIp_freq)
                case 'Ic3[A]'
                    plot(axgen,var.f,var.modIc3_freq)
                case 'VC1[V]'
                    plot(axgen,var.f,var.VC1_freq)
                case 'VC2[V]'
                    plot(axgen,var.f,var.VC2_freq)


                otherwise
            end
            %plot(axgen,var.f,yvar)
            hold(axgen,'on')
            xlabel(axgen,'frequency[Hz]')

        case 'misalignment[%]'

            switch ystr
                case'I1[A]'
                    plot(axgen,var.posyrelativa,var.modI1_pos)
                case'I2[A]'
                    plot(axgen,var.posyrelativa,var.modI2_pos)
                case'VL[V]'
                    plot(axgen,var.posyrelativa,var.VL_pos)
                case'Argument[degree]'
                    plot(axgen,var.posyrelativa,
               var.A2rgumentoredondeado_pos)
                case'PL[W]'
                    plot(axgen,var.posyrelativa,var.PL_pos)
                case'Efficiency[%]'
                    plot(axgen,var.posyrelativa,var.rend_pos)
                case 'P1[W]'
                    plot(axgen,var.posyrelativa,var.P1_pos)
                case 'Ip[A]'
                    plot(axgen,var.posyrelativa,var.modIp_pos)
                case 'Ic3[A]'
```

```
                    plot(axgen,var.posyrelativa,var.modIc3_pos)
                case 'VC1[V]'
                    plot(axgen,var.posyrelativa,var.VC1_pos)
                case 'VC2[V]'
                    plot(axgen,var.posyrelativa,var.VC2_pos)

                otherwise
            end
            % plot(axgen,var.posyrelativa,yvar)
            hold(axgen,'on')
            xlabel(axgen,'misalignment[%]')
        case 'R de carga/Rnominal'

            switch ystr
                case'I1[A]'
                    plot(axgen,var.variacioncarga
                    ,var.modI1_carga)
                case'I2[A]'
                    plot(axgen,var.variacioncarga,
                     var.modI2_carga)
                case'VL[V]'
                    plot(axgen,var.variacioncarga,
                       var.VL_carga)
                case'Argument[degree]'
                    plot(axgen,var.variacioncarga,
                    var.A2rgumentoredondeado_carga)
                case'PL[W]'
                    plot(axgen,var.variacioncarga,
                       var.PL_carga)
                case'Efficiency[%]'
                    plot(axgen,var.variacioncarga,var.rend_carga)
                case 'P1[W]'
                    plot(axgen,var.variacioncarga,var.P1_carga)
                case 'Ip[A]'
                    plot(axgen,var.variacioncarga,
                     var.modIp_carga)
                case 'Ic3[A]'
                    plot(axgen,var.variacioncarga,
                    var.modIc3_carga)
                case 'VC1[V]'
                    plot(axgen,var.variacioncarga,var.VC1_carga)
                case 'VC2[V]'
                    plot(axgen,var.variacioncarga,var.VC2_carga)
                otherwise
            end
            %plot(axgen,var.variacioncarga,yvar)
            hold(axgen,'on')
            xlabel(axgen,'R de carga/Rnominal')
```

```
                otherwise
            end


        end

    end

    methods (Access = public)


    end


    methods (Access = private)

        % Code that executes after component creation
        function startupFcn(app)

app.DatosEjedeabcisasDropDown.Items={'airgap[m]','frequency[Hz]','misalig
nment[%]','R de carga/Rnominal'};
            app.DatosdelPerfil1DropDown.Items={'I1[A]',
'I2[A]','Argument[degree]','VL[V]','PL[W]','Efficiency[%]','P1[W]','Ip[A]
','Ic3[A]','VC1[V]','VC2[V]'};
            app.DatosdelPerfil2DropDown.Items={'I1[A]',
'I2[A]','Argument[degree]','VL[V]','PL[W]','Efficiency[%]','P1[W]','Ip[A]
','Ic3[A]','VC1[V]','VC2[V]'};
            %Dejamos los plots preparados
            Formatplots(app)
            cla(app.UIAxes5,'reset')
            app.UIAxes5.XMinorGrid =     'on' ;
            app.UIAxes5.YMinorGrid =     'on' ;
            %f = uifigure;
            app.ExportaraxlsButton.Enable='off';
            app.CargarperfilButton.Enable= 'off';
            app.ExportaraSimulinkButton.Enable = 'off';
            app.ExportaraWorkspaceButton.Enable = 'off';
            app.StopButton.Enable = 'off';
            app.lastcase = 'rec';
            app.GeomtricosPanel_2.Visible='off';
            app.RepresentarButton_2.Enable='off';


        end

        % Value changed function: VccVEditField
        function VccVEditFieldValueChanged(app, event)
```

```
        app.Vcc = app.VccVEditField.Value;
        app.V1=2*sqrt(2)*app.Vcc/pi();
        app.V1VEditField.Enable='on';
        app.V1VEditField.Value=app.V1;
        app.V1VEditField.Enable='off';

    end

    % Button pushed function: CalcularyguardarparmetrosButton
    function CalcularyguardarparmetrosButtonPushed(app, event)
        %Al darle a calcular actualiza todas las variables y además
        calcula parámetros
        app.DiseadordesistemasWPTUIFigure.Interruptible='on';
        app.StopButton.Enable = 'on';
        %activamos el boton para interrumpir
        if isequal(app.NombredelPerfilEditField.Value,'')
            Advertwindow(app,'No se puede dejar el nombre de perfil
                          en blanco');

        else
            DisableEnalbebutton(app,'off');
            if Checkparameter(app,'Los nombres son iguales se
                     sobreescribiran')==true
                upparameters(app);
                app.objc = CalcRecCirc(app);
                if app.objc.Sol==true
                    WriteSol(app,app.objc);
                    Overwrite(app);%ahora lo que hacemos es
                           sobreescribir
                    Formatplots(app);
                    Plotgroup(app,app.Almobjc( Findindexgru(app)))
                    message = sprintf('La solución encontrada fue
                         sobreescrita');
                    uialert(app.DiseadordesistemasWPTUIFigure,
                       message,'Éxito',...
                        'Icon','success');
                else
                    message = sprintf('No se ha encontrado solución!
                  \n Considera aumentar N1 N2');
                    uialert(app.DiseadordesistemasWPTUIFigure,
                message,'Warning', 'Icon','warning');
                end
                DisableEnalbebutton(app,'on');

            else

                upparameters(app);
                app.objc = CalcRecCirc(app);
```

```
                    if app.objc.Sol==true
                    % si no es true no ha encontrado solución

                        WriteSol(app,app.objc);
                        Keepandrefress(app);%Guarda dentro de un vector
                        Formatplots(app);
                        Plotgroup(app,app.Almobjc( Findindexgru(app)));
                        message = sprintf('Solución encontrada');
                        uialert(app.DiseadordesistemasWPTUIFigure,
                        message,'Solución encontrada','Icon','success');
                        app.NombredelPerfilEditField.Value='';%lo vacio
para que cuando queira introducir nuevo nombre tenga que escribirlo
                    else
                        if app.stop
                            message = sprintf('Se ha parado la operacion!
                                  \n ');
                            uialert(app.DiseadordesistemasWPTUIFigure,
                          message,'Warning',...
                                'Icon','warning');
                        else
                            message = sprintf('No se ha encontrado
solucion! \n Considera aumentar N1 N2');
                            uialert(app.DiseadordesistemasWPTUIFigure,
                          message,'Warning',...
                                'Icon','warning');
                        end
                    end
                    DisableEnalbebutton(app,'on');


                end


            end
            ActualizaKC(app);
            app.DiseadordesistemasWPTUIFigure.Interruptible='off';
            app.StopButton.Enable = 'off';%desactivamos el botón para
                              interrumpir
            app.stop=false;
        end

        % Value changed function: b2mEditField
        function b2mEditFieldValueChanged(app, event)
            app.a1 = app.a1mEditField.Value;
            app.a2 = app.a2mEditField.Value;
            app.b1 = app.b1mEditField.Value;
            app.b2 = app.b2mEditField.Value;
            if app.a1~=0 && app.a2~=0 && app.b1~=0 && app.b2~=0
```

```
            app.c=-(app.a1-app.a2)/2;
            app.e=(app.b1-app.b2)/2;
            app.cmEditField.Value=app.c;
            app.emEditField.Value=app.e;
        end
    end

    % Value changed function: a1mEditField
    function a1mEditFieldValueChanged(app, event)
        app.a1 = app.a1mEditField.Value;
        app.a2 = app.a2mEditField.Value;
        app.b1 = app.b1mEditField.Value;
        app.b2 = app.b2mEditField.Value;
        if app.a1~=0 && app.a2~=0 && app.b1~=0 && app.b2~=0
            app.c=-(app.a1-app.a2)/2;
            app.e=(app.b1-app.b2)/2;
            app.cmEditField.Value=app.c;
            app.emEditField.Value=app.e;
        end

    end

    % Value changed function: b1mEditField
    function b1mEditFieldValueChanged(app, event)
        app.a1 = app.a1mEditField.Value;
        app.a2 = app.a2mEditField.Value;
        app.b1 = app.b1mEditField.Value;
        app.b2 = app.b2mEditField.Value;
        if app.a1~=0 && app.a2~=0 && app.b1~=0 && app.b2~=0
            app.c=-(app.a1-app.a2)/2;
            app.e=(app.b1-app.b2)/2;
            app.cmEditField.Value=app.c;
            app.emEditField.Value=app.e;
        end

    end

    % Value changed function: a2mEditField
    function a2mEditFieldValueChanged(app, event)
        app.a1 = app.a1mEditField.Value;
        app.a2 = app.a2mEditField.Value;
        app.b1 = app.b1mEditField.Value;
        app.b2 = app.b2mEditField.Value;
        if app.a1~=0 && app.a2~=0 && app.b1~=0 && app.b2~=0
            app.c=-(app.a1-app.a2)/2;
            app.e=(app.b1-app.b2)/2;
            app.cmEditField.Value=app.c;
            app.emEditField.Value=app.e;
```

```
    end
end

% Callback function
function RepresentarButtonPushed(app, event)
    % representa
    Formatplots(app)

    Plotgroup(app,app.Almobjc( Findindexgru(app)));

end

% Button pushed function: RepresentarButton_2
function RepresentarButton_2Pushed(app, event)
    %Primer paso Perfil 1

    ytringval = app.DatosdelPerfil1DropDown.Value;
    xstringval= app.DatosEjedeabcisasDropDown.Value;
    Objleft=app.Almobjc(Findindexind(
             app,app.Perfil1DropDown.Value));
    Objright=app.Almobjc(Findindexind(
             app,app.Perfil2DropDown.Value));
    nperfil1=app.Perfil1DropDown.Value;
    nperfil2=app.Perfil2DropDown.Value;
    ytringval2 = app.DatosdelPerfil2DropDown.Value;
    if Plottogether(app,ytringval, ytringval2)
        if isequal(ytringval,ytringval2) &&
       Findindexind(app,app.Perfil2DropDown.Value)==
        Findindexind(app,app.Perfil1DropDown.Value)
            Plotindv(app ,xstringval,'left',Objleft,ytringval,0);
            legend(app.UIAxes5,{ytringval },'Location','best')
        else
            Plotindv(app ,xstringval,'left',Objleft,ytringval,0);
            Plotindv(app,xstringval,'left',Objright,ytringval2,0)
            legend(app.UIAxes5,{[ytringval ' ' nperfil1],
            [ytringval2 ' ' nperfil2]},'Location','best')
        end
    else
        Plotindv(app ,xstringval,'left',Objleft,ytringval,1);
        Plotindv(app ,xstringval,'right',Objright,ytringval2,1);

    end

end

% Button pushed function: LimpiarButton
function LimpiarButtonPushed(app, event)
    cla(app.UIAxes5,'reset')
```

```
    app.UIAxes5.XMinorGrid =     'on' ;
    app.UIAxes5.YMinorGrid =     'on' ;
end

% Button pushed function: ExportaraxlsButton
function ExportaraxlsButtonPushed(app, event)
    try
        obji=app.Almobjc(Findindexind(
             app,app.Perfil1DropDown.Value));
        caso=app.Perfil1DropDown.Value;
        topologia=obji.Comtype;

        Valores_optimos= {'solucion_optima'};

        topologia=string(topologia);
        KC=obji.KC;

        frecuencia= obji.f0(obji.opt(1),obji.opt(2));
        N1_optima =obji.opt(1);
        N2_optima = obji.opt(2);
        S1_optima_mm2= abs(obji.S1(obji.opt(1),obji.opt(2)))*1e6;
        S2_optima_mm2= abs(obji.S2(obji.opt(1),obji.opt(2)))*1e6;
        L1_optima= abs(obji.L1(obji.opt(1),obji.opt(2)));
        L2_optima= abs(obji.L2(obji.opt(1),obji.opt(2)));
        P1=abs(obji.P1(obji.opt(1),obji.opt(2)));
        PL=abs(obji.PL(obji.opt(1),obji.opt(2)));
        Rend=abs(obji.rend(obji.opt(1),obji.opt(2)));
        if KC==1
            C2=abs(obji.C2(obji.opt(1),obji.opt(2)));
            C3=abs(obji.C3(obji.opt(1),obji.opt(2)));
            IC2=abs(obji.IC2(obji.opt(1),obji.opt(2)));
            IC3=abs(obji.IC3(obji.opt(1),obji.opt(2)));
            VC2=abs(obji.VC2(obji.opt(1),obji.opt(2)));
            VC3=abs(obji.VC3(obji.opt(1),obji.opt(2)));
            C1=0;
            IC1=0;
            VC1=0;
            L3=0;
            VL3=0;
            IL3=0;

        elseif KC==0
            C1=abs(obji.C1(obji.opt(1),obji.opt(2)));
            C2=abs(obji.C2(obji.opt(1),obji.opt(2)));
            VC1=abs(obji.VC1(obji.opt(1),obji.opt(2)));
            VC2=abs(obji.VC2(obji.opt(1),obji.opt(2)));
            IC1=abs(obji.IC1(obji.opt(1),obji.opt(2)));
            IC2=abs(obji.IC2(obji.opt(1),obji.opt(2)));
```

```
            L3=0;
            C3=0;
            VC3=0;
            IC3=0;
            IL3=0;
            VL3=0;


        else

            C1=abs(obji.C1(obji.opt(1),obji.opt(2)));
            C2=abs(obji.C2(obji.opt(1),obji.opt(2)));
            C3=abs(obji.C3(obji.opt(1),obji.opt(2)));
            L3=abs(obji.L3(obji.opt(1),obji.opt(2)));
            VC1=abs(obji.VC1(obji.opt(1),obji.opt(2)));
            VC2=abs(obji.VC2(obji.opt(1),obji.opt(2)));
            VC3=abs(obji.VC3(obji.opt(1),obji.opt(2)));
            VL3=abs(obji.VL3(obji.opt(1),obji.opt(2)));
            IC1=abs(obji.IC1(obji.opt(1),obji.opt(2)));
            IC2=abs(obji.IC2(obji.opt(1),obji.opt(2)));
            IC3=abs(obji.IC3(obji.opt(1),obji.opt(2)));
            IL3=abs(obji.IL3(obji.opt(1),obji.opt(2)));
        end


        T = table(topologia,KC,frecuencia,P1,PL,Rend,
         L1_optima,L2_optima,N1_optima,N2_optima,
               S1_optima_mm2,S2_optima_mm2,
             C1,C2,C3,L3,VC1,VC2,VC3,VL3,IC1,
               'RowNames',Valores_optimos);

        writetable(T,[caso,'.xls'],'Sheet',1);
        message = sprintf(['Exportado correctamente a '
                        caso '.xls']);
        uialert(app.DiseadordesistemasWPTUIFigure,
      message,'Exportado correcto','Icon','success');
    catch
        message = sprintf('No se ha conseguido exportar');
        uialert(app.DiseadordesistemasWPTUIFigure,
           message,'Warning','Icon','warning');
    end
end

% Value changed function: KCFactorEditField
function KCFactorEditFieldValueChanged(app, event)
    value = app.KCFactorEditField.Value;
    if value==0
```

```
            app.CompensacinLabel.Text='SS';
            app.imageButton.Icon='SS.png';
        end

        if value==1
            app.CompensacinLabel.Text='PS';
            app.imageButton.Icon='PS.png';

        end
        if value~=1 && value~=0
            app.CompensacinLabel.Text='SPS';
            app.imageButton.Icon='SPS.png';
        end
    end

    % Button pushed function: LimpiarButton_2
    function LimpiarButtondisenPushed(app, event)
        Cleandata(app,0);
        Formatplots(app);
        app.NombredelPerfilEditField.Value='';
    end

    % Button pushed function: CargarperfilButton
    function CargarperfilButtonPushed(app, event)
        Cleandata(app,0);      %Funcion limpiar por ahora rellena con
unos
        SetRecCirc(app,app.Almobjc( Findindexgru(app)));
        Loadolddata(app,app.Almobjc( Findindexgru(app)));

        Formatplots(app);

        Plotgroup(app,app.Almobjc( Findindexgru(app)));
        ActualizaKC(app)
    end

    % Value changed function: imageButton
    function imagebuu(app, event)
        value = app.KCFactorEditField.Value;
        if value==0

            app.CompensacinLabel.Text='SS';
            app.imageButton.Icon='SS.png';
        end

        if value==1
            app.CompensacinLabel.Text='PS';
            app.imageButton.Icon='PS.png';
```

```
            end
            if value~=1 && value~=0
                app.CompensacinLabel.Text='SPS';
                app.imageButton.Icon='SPS.png';
            end

        end

        % Button pushed function: ExportaraSimulinkButton
        function ExportaraSimulinkButtonPushed(app, event)
            try

                %Primero guarda las variables autilizar en el workspace

                assignin('base','Vcc',app.VccVEditField.Value)
                assignin('base','foptima',
                     app.FrecuenciaHzEditField.Value)

                assignin('base','L3_optima',app.L3HEditField.Value)
                assignin('base','C1_optima',app.C1FEditField.Value)
                assignin('base','C3_optima',app.C3FEditField.Value)


assignin('base','R1_optima',app.R1OmEditField.Value)%falta r1 r2
                assignin('base','L1_optima',app.L1HEditField.Value)
                assignin('base','R2_optima',app.R2OmEditField.Value)
                assignin('base','L2_optima',app.L2HEditField.Value)
                assignin('base','M_optima',app.MHEditField.Value)

                assignin('base','C2_optima',app.C2FEditField.Value)
                %Despues lanza simulink

                open('Modelosim'); %hace falta el modelo
                %sim('Modelosim.mdl',1) %falta un script la bateria litio
                message = sprintf('Simulink lanzado correctamente');
                uialert(app.DiseadordesistemasWPTUIFigure,
              message,'Exportado correcto','Icon','success');
            catch
                message = sprintf('No se ha podido lanzar Simulink');
                uialert(app.DiseadordesistemasWPTUIFigure,
                   message,'Warning','Icon','warning');
            end
        end

        % Value changed function: NombredelPerfilEditField
        function NombredelPerfilEditFieldValueChanged(app, event)

            Checkparameter(app,'los nombres iguales se sobreescriben')
```

```
        %comprueba que el nombre no sea igual y lanza advertencia


    end

    % Button pushed function: ExportaraWorkspaceButton
    function ExportaraWorkspaceButtonPushed(app, event)
        try

            name=app.PerfilesguardadosDropDown.Value;
            if isequal(name,'')
                Advertwindow(app,'error : No se pudo guardar en el
                          workspace' );
            else
                assignin('base',name,app.Almobjc( Findindexgru(app)))
                message = sprintf(['El objeto ',name,' fue guardado
                        correctamente']);
                uialert(app.DiseadordesistemasWPTUIFigure,
                message,'Exportado correcto','Icon','success');

            end

        catch
            Advertwindow(app,'error : objeto con caracteres no
                         permitidos' );
        end
    end

    % Button pushed function: StopButton
    function StopButtonPushed(app, event)
        app.stop=true;
        disp('cancelado por el usuario')
    end

    % Button pushed function: ImportardesdeWokspceButton
    function ImportardesdeWokspceButtonPushed(app, event)
        name=app.NombredelPerfilEditField.Value;
        try
            obj=evalin('base',name);
            if isobject(obj)
                if Checkparameter(app,'Los nombres son iguales se
                      sobrescribiran')==true
                    Overwrite(app)
                else
                    app.objc=evalin('base',name);
                    Keepandrefress(app);
                    app.NombredelPerfilEditField.Value='';
                    DisableEnalbebutton(app,'on')
```

```
                    message = sprintf('Perfil de datos cargado en el
                        menu desplegable');
                    uialert(app.DiseadordesistemasWPTUIFigure,message,
                'Importado de datos correcto',...
                        'Icon','success');
                end

            end
        catch
          Advertwindow(app,'No existe una variable con ese nombre ')
        end
    end

    % Button pushed function: Button
    function ButtonPushed(app, event)
        ChangeRecCirc(app)
    end

    % Button pushed function: Button_2
    function Button_2Pushed(app, event)
        ChangeRecCirc(app)
    end

    % Value changed function: Perfil1DropDown
    function Perfil1DropDownValueChanged(app, event)
        perf1=app.Almobjc(Findindexind(app,
                    app.Perfil1DropDown.Value));
        perf2=app.Almobjc(Findindexind(app,
                    app.Perfil2DropDown.Value));

        if isequal(perf1.Gtype,'rec') && isequal(perf2.Gtype,'rec')
            EnablePlots(app,perf1)

            EnablePlots(app,perf2)
        else
            if isequal(perf1.Gtype,'cir')
                EnablePlots(app,perf1)
            end
            if isequal(perf2.Gtype,'cir')
                EnablePlots(app,perf2)
            end
        end

    end

    % Value changed function: Perfil2DropDown
    function Perfil2DropDownValueChanged(app, event)
```

```
        perf1=app.Almobjc(Findindexind(
                 app,app.Perfil1DropDown.Value));
        perf2=app.Almobjc(Findindexind(
                 app,app.Perfil2DropDown.Value));

        if isequal(perf1.Gtype,'rec') && isequal(perf2.Gtype,'rec')
            EnablePlots(app,perf1)

            EnablePlots(app,perf2)
        else
            if isequal(perf1.Gtype,'cir')
                EnablePlots(app,perf1)
            end
            if isequal(perf2.Gtype,'cir')
                EnablePlots(app,perf2)
            end
        end

    end

    % Button pushed function: RepresentarenunanuevaventanaButton
    function RepresentarenunanuevaventanaButtonPushed(app, event)
        %
        app.ventana= figure('Name','Análisis
                comparativo','NumberTitle','off');
        axgen=axes(app.ventana);
        axgen.XMinorGrid='on';
        axgen.YMinorGrid='on';
        ytringval = app.DatosdelPerfil1DropDown.Value;
        xstringval= app.DatosEjedeabcisasDropDown.Value;
        Objleft=app.Almobjc(Findindexind(
                 app,app.Perfil1DropDown.Value));
        Objright=app.Almobjc(Findindexind(
                 app,app.Perfil2DropDown.Value));
        ytringval2 = app.DatosdelPerfil2DropDown.Value;
        nperfil1=app.Perfil1DropDown.Value;
        nperfil2=app.Perfil2DropDown.Value;


        if Plottogether(app,ytringval, ytringval2)
            if isequal(ytringval,ytringval2) &&
           Findindexind(app,app.Perfil2DropDown.Value)==Findindexind(
            app,app.Perfil1DropDown.Value)

                Plotnew(app,axgen,xstringval,
                    'left',Objleft,ytringval,0
                axgen.XMinorGrid='on';
                axgen.YMinorGrid='on';
```

```
                    legend(axgen,{ytringval },'Location','best')
                else
                    Plotnew(app,axgen
                    ,xstringval,'left',Objleft,ytringval,0);
                    Plotnew(app,axgen ,xstringval,'left',
                          Objright,ytringval2,0)
                    axgen.XMinorGrid='on';
                    axgen.YMinorGrid='on';
                    legend(axgen,{[ytringval nperfil1], [ytringval2
                      nperfil2]},'Location','best')
                end
            else

                Plotnew(app,axgen
,xstringval,'left',Objleft,ytringval,1);

                ylabel(axgen, ytringval)
                Plotnew(app,axgen
,xstringval,'right',Objright,ytringval2,1);
                   %app string x left right var ystring
                ylabel(axgen, ytringval2)
                %legend(axgen,{[ytringval '(Perfil1)'],[ytringval2
'(Perfil2)']},'Location','best') %no sale bien
            end

        end
    end

    % App initialization and construction
    methods (Access = private)

        % Create UIFigure and components
        function createComponents(app)

            % Create DiseadordesistemasWPTUIFigure
            app.DiseadordesistemasWPTUIFigure = uifigure;
            app.DiseadordesistemasWPTUIFigure.Position = [100 100 1201
                                  828];
            app.DiseadordesistemasWPTUIFigure.Name = 'Diseñador de
                                 sistemas WPT';
            setAutoResize(app, app.DiseadordesistemasWPTUIFigure, true)

            % Create TabGroup
            app.TabGroup = uitabgroup(app.DiseadordesistemasWPTUIFigure);
            app.TabGroup.Position = [1 26 1195 803];

            % Create DiseoTab
            app.DiseoTab = uitab(app.TabGroup);
```

```
app.DiseoTab.Title = 'Diseño';
app.DiseoTab.Units = 'pixels';

% Create CalcularyguardarparmetrosButton
app.CalcularyguardarparmetrosButton = uibutton(app.DiseoTab,
                    'push');
app.CalcularyguardarparmetrosButton.ButtonPushedFcn =
                    createCallbackFcn(app,
  @CalcularyguardarparmetrosButtonPushed, true);
app.CalcularyguardarparmetrosButton.Position = [563 722 205
                      22];
app.CalcularyguardarparmetrosButton.Text = 'Calcular y
               guardar parámetros';

% Create ExportaraxlsButton
app.ExportaraxlsButton = uibutton(app.DiseoTab, 'push');
app.ExportaraxlsButton.ButtonPushedFcn =
 createCallbackFcn(app, @ExportaraxlsButtonPushed, true);
app.ExportaraxlsButton.Position = [1036 751 100 22];
app.ExportaraxlsButton.Text = 'Exportar a .xls';

% Create SolucinptimaPanel
app.SolucinptimaPanel = uipanel(app.DiseoTab);
app.SolucinptimaPanel.Title = 'Solución óptima';
app.SolucinptimaPanel.Position = [552 17 606 685];

% Create DatosGeneralesPanel
app.DatosGeneralesPanel = uipanel(app.SolucinptimaPanel);
app.DatosGeneralesPanel.Title = 'Datos Generales';
app.DatosGeneralesPanel.Position = [12 237 581 408];

% Create PabsWLabel
app.PabsWLabel = uilabel(app.DatosGeneralesPanel);
app.PabsWLabel.HorizontalAlignment = 'right';
app.PabsWLabel.Position = [92 343 53 15];
app.PabsWLabel.Text = 'Pabs [W]';

% Create PabsWEditField
app.PabsWEditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.PabsWEditField.ValueDisplayFormat = '%e';
app.PabsWEditField.Position = [158 339 100 22];

% Create PcargaWLabel
app.PcargaWLabel = uilabel(app.DatosGeneralesPanel);
app.PcargaWLabel.HorizontalAlignment = 'right';
app.PcargaWLabel.Position = [288 343 64 15];
app.PcargaWLabel.Text = 'Pcarga [W]';
```

```
            % Create PcargaWEditField
            app.PcargaWEditField = uieditfield(app.DatosGeneralesPanel,
                                'numeric');
            app.PcargaWEditField.ValueDisplayFormat = '%e';
            app.PcargaWEditField.Position = [367 339 100 22];

            % Create densiI2Amm2Label
            app.densiI2Amm2Label = uilabel(app.DatosGeneralesPanel);
            app.densiI2Amm2Label.HorizontalAlignment = 'right';
            app.densiI2Amm2Label.Position = [260 304 92 15];
            app.densiI2Amm2Label.Text = 'densiI2 [A/mm2]';

            % Create densiI2Amm2EditField
            app.densiI2Amm2EditField =
uieditfield(app.DatosGeneralesPanel, 'numeric');
            app.densiI2Amm2EditField.ValueDisplayFormat = '%e';
            app.densiI2Amm2EditField.Position = [367 300 100 22];

            % Create RendimientoEditFieldLabel
            app.RendimientoEditFieldLabel =
                    uilabel(app.DatosGeneralesPanel);
            app.RendimientoEditFieldLabel.HorizontalAlignment = 'right';
            app.RendimientoEditFieldLabel.Position = [70 268 75 15];
            app.RendimientoEditFieldLabel.Text = 'Rendimiento';

            % Create RendimientoEditField
            app.RendimientoEditField =
             uieditfield(app.DatosGeneralesPanel, 'numeric');
            app.RendimientoEditField.ValueDisplayFormat = '%.4f';
            app.RendimientoEditField.Position = [158 264 100 22];

            % Create N1EditFieldLabel
            app.N1EditFieldLabel = uilabel(app.DatosGeneralesPanel);
            app.N1EditFieldLabel.HorizontalAlignment = 'right';
            app.N1EditFieldLabel.Position = [120 229 25 15];
            app.N1EditFieldLabel.Text = 'N1';

            % Create N1EditField
            app.N1EditField = uieditfield(app.DatosGeneralesPanel,
                                'numeric');
            app.N1EditField.Position = [158 225 100 22];

            % Create N2EditFieldLabel
            app.N2EditFieldLabel = uilabel(app.DatosGeneralesPanel);
            app.N2EditFieldLabel.HorizontalAlignment = 'right';
            app.N2EditFieldLabel.Position = [327 229 25 15];
            app.N2EditFieldLabel.Text = 'N2';
```

```
% Create N2EditField
app.N2EditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.N2EditField.Position = [367 225 100 22];

% Create FrecuenciaHzEditFieldLabel
app.FrecuenciaHzEditFieldLabel =
        uilabel(app.DatosGeneralesPanel);
app.FrecuenciaHzEditFieldLabel.HorizontalAlignment = 'right';
app.FrecuenciaHzEditFieldLabel.Position = [262 268 90 15];
app.FrecuenciaHzEditFieldLabel.Text = 'Frecuencia [Hz]';

% Create FrecuenciaHzEditField
app.FrecuenciaHzEditField =
 uieditfield(app.DatosGeneralesPanel, 'numeric');
app.FrecuenciaHzEditField.ValueDisplayFormat = '%e';
app.FrecuenciaHzEditField.Position = [367 264 100 22];

% Create L1HEditFieldLabel
app.L1HEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.L1HEditFieldLabel.HorizontalAlignment = 'right';
app.L1HEditFieldLabel.Position = [108 188 37 15];
app.L1HEditFieldLabel.Text = 'L1 [H]';

% Create L1HEditField
app.L1HEditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.L1HEditField.ValueDisplayFormat = '%e';
app.L1HEditField.Position = [158 184 100 22];

% Create L2HEditFieldLabel
app.L2HEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.L2HEditFieldLabel.HorizontalAlignment = 'right';
app.L2HEditFieldLabel.Position = [315 188 37 15];
app.L2HEditFieldLabel.Text = 'L2 [H]';

% Create L2HEditField
app.L2HEditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.L2HEditField.ValueDisplayFormat = '%e';
app.L2HEditField.Position = [367 184 100 22];

% Create MHEditFieldLabel
app.MHEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.MHEditFieldLabel.HorizontalAlignment = 'right';
app.MHEditFieldLabel.Position = [319 35 33 15];
app.MHEditFieldLabel.Text = 'M [H]';
```

```
% Create MHEditField
app.MHEditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.MHEditField.ValueDisplayFormat = '%e';
app.MHEditField.Position = [367 31 100 22];

% Create S1mm2EditFieldLabel
app.S1mm2EditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.S1mm2EditFieldLabel.HorizontalAlignment = 'right';
app.S1mm2EditFieldLabel.Position = [89 115 56 15];
app.S1mm2EditFieldLabel.Text = 'S1 [mm2]';

% Create S1mm2EditField
app.S1mm2EditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.S1mm2EditField.ValueDisplayFormat = '%e';
app.S1mm2EditField.Position = [158 111 100 22];

% Create S2mm2EditFieldLabel
app.S2mm2EditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.S2mm2EditFieldLabel.HorizontalAlignment = 'right';
app.S2mm2EditFieldLabel.Position = [296 115 56 15];
app.S2mm2EditFieldLabel.Text = 'S2 [mm2]';

% Create S2mm2EditField
app.S2mm2EditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.S2mm2EditField.ValueDisplayFormat = '%e';
app.S2mm2EditField.Position = [367 111 100 22];

% Create I1AEditFieldLabel
app.I1AEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.I1AEditFieldLabel.HorizontalAlignment = 'right';
app.I1AEditFieldLabel.Position = [113 77 32 15];
app.I1AEditFieldLabel.Text = 'I1 [A]';

% Create I1AEditField
app.I1AEditField = uieditfield(app.DatosGeneralesPanel,
                    'numeric');
app.I1AEditField.ValueDisplayFormat = '%e';
app.I1AEditField.Position = [158 73 100 22];

% Create I2AEditFieldLabel
app.I2AEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.I2AEditFieldLabel.HorizontalAlignment = 'right';
app.I2AEditFieldLabel.Position = [320 77 32 15];
app.I2AEditFieldLabel.Text = 'I2 [A]';
```

```
% Create I2AEditField
app.I2AEditField = uieditfield(app.DatosGeneralesPanel,
                   'numeric');
app.I2AEditField.ValueDisplayFormat = '%e';
app.I2AEditField.Position = [367 73 100 22];

% Create R2OmEditFieldLabel
app.R2OmEditFieldLabel = uilabel(app.DatosGeneralesPanel);
app.R2OmEditFieldLabel.HorizontalAlignment = 'right';
app.R2OmEditFieldLabel.Position = [303 154 49 15];
app.R2OmEditFieldLabel.Text = 'R2 [Om]';

% Create R2OmEditField
app.R2OmEditField = uieditfield(app.DatosGeneralesPanel,
                   'numeric');
app.R2OmEditField.Position = [367 150 100 22];

% Create R1OmLabel
app.R1OmLabel = uilabel(app.DatosGeneralesPanel);
app.R1OmLabel.HorizontalAlignment = 'right';
app.R1OmLabel.Position = [96 154 49 15];
app.R1OmLabel.Text = 'R1 [Om]';

% Create R1OmEditField
app.R1OmEditField = uieditfield(app.DatosGeneralesPanel,
                   'numeric');
app.R1OmEditField.Position = [158 150 100 22];

% Create densiI1Amm2Label
app.densiI1Amm2Label = uilabel(app.DatosGeneralesPanel);
app.densiI1Amm2Label.HorizontalAlignment = 'right';
app.densiI1Amm2Label.Position = [53 304 92 15];
app.densiI1Amm2Label.Text = 'densiI1 [A/mm2]';

% Create densiI1Amm2EditField
app.densiI1Amm2EditField =
 uieditfield(app.DatosGeneralesPanel, 'numeric');
app.densiI1Amm2EditField.ValueDisplayFormat = '%e';
app.densiI1Amm2EditField.Position = [158 300 100 22];

% Create IpALabel
app.IpALabel = uilabel(app.DatosGeneralesPanel);
app.IpALabel.HorizontalAlignment = 'right';
app.IpALabel.Position = [113 35 32 15];
app.IpALabel.Text = 'Ip [A]';

% Create IpAEditField
```

```
    app.IpAEditField = uieditfield(app.DatosGeneralesPanel,
                        'numeric');
    app.IpAEditField.Position = [160 31 100 22];

    % Create CondensadoresybobinasdecompensacionPanel
    app.CondensadoresybobinasdecompensacionPanel =
             uipanel(app.SolucinptimaPanel);
    app.CondensadoresybobinasdecompensacionPanel.Title =
        'Condensadores y bobinas de compensacion';
    app.CondensadoresybobinasdecompensacionPanel.Position = [12
                       32 581 180];

    % Create C1FEditFieldLabel
    app.C1FEditFieldLabel =
uilabel(app.CondensadoresybobinasdecompensacionPanel);
    app.C1FEditFieldLabel.HorizontalAlignment = 'right';
    app.C1FEditFieldLabel.Position = [13 118 37 15];
    app.C1FEditFieldLabel.Text = 'C1 [F]';

    % Create C1FEditField
    app.C1FEditField = uieditfield(
    app.CondensadoresybobinasdecompensacionPanel, 'numeric');
    app.C1FEditField.ValueDisplayFormat = '%e';
    app.C1FEditField.Position = [65 114 100 22];

    % Create C2FEditFieldLabel
    app.C2FEditFieldLabel = uilabel(
      app.CondensadoresybobinasdecompensacionPanel);
    app.C2FEditFieldLabel.HorizontalAlignment = 'right';
    app.C2FEditFieldLabel.Position = [12 83 37 15];
    app.C2FEditFieldLabel.Text = 'C2 [F]';

    % Create C2FEditField
    app.C2FEditField = uieditfield(
    app.CondensadoresybobinasdecompensacionPanel, 'numeric');
    app.C2FEditField.ValueDisplayFormat = '%e';
    app.C2FEditField.Position = [64 79 100 22];

    % Create C3FEditFieldLabel
    app.C3FEditFieldLabel = uilabel(
    app.CondensadoresybobinasdecompensacionPanel);
    app.C3FEditFieldLabel.HorizontalAlignment = 'right';
    app.C3FEditFieldLabel.Position = [12 50 37 15];
    app.C3FEditFieldLabel.Text = 'C3 [F]';

    % Create C3FEditField
    app.C3FEditField = uieditfield(
    app.CondensadoresybobinasdecompensacionPanel, 'numeric');
```

```
app.C3FEditField.ValueDisplayFormat = '%e';
app.C3FEditField.Position = [64 46 100 22];

% Create VC1VEditFieldLabel
app.VC1VEditFieldLabel = uilabel(
  app.CondensadoresybobinasdecompensacionPanel);
app.VC1VEditFieldLabel.HorizontalAlignment = 'right';
app.VC1VEditFieldLabel.Position = [176 117 46 15];
app.VC1VEditFieldLabel.Text = 'VC1 [V]';

% Create VC1VEditField
app.VC1VEditField = uieditfield(
  app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.VC1VEditField.ValueDisplayFormat = '%e';
app.VC1VEditField.Position = [237 113 100 22];

% Create VC2VEditFieldLabel
app.VC2VEditFieldLabel = uilabel(
  app.CondensadoresybobinasdecompensacionPanel);
app.VC2VEditFieldLabel.HorizontalAlignment = 'right';
app.VC2VEditFieldLabel.Position = [176 82 46 15];
app.VC2VEditFieldLabel.Text = 'VC2 [V]';

% Create VC2VEditField
app.VC2VEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.VC2VEditField.ValueDisplayFormat = '%e';
app.VC2VEditField.Position = [237 78 100 22];

% Create VC3VEditFieldLabel
app.VC3VEditFieldLabel = uilabel(
  app.CondensadoresybobinasdecompensacionPanel);
app.VC3VEditFieldLabel.HorizontalAlignment = 'right';
app.VC3VEditFieldLabel.Position = [176 50 46 15];
app.VC3VEditFieldLabel.Text = 'VC3 [V]';

% Create VC3VEditField
app.VC3VEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.VC3VEditField.ValueDisplayFormat = '%e';
app.VC3VEditField.Position = [237 46 100 22];

% Create VL3VEditFieldLabel
app.VL3VEditFieldLabel = uilabel(
 app.CondensadoresybobinasdecompensacionPanel);
app.VL3VEditFieldLabel.HorizontalAlignment = 'right';
app.VL3VEditFieldLabel.Position = [178 14 44 15];
app.VL3VEditFieldLabel.Text = 'VL3 [V]';
```

```
% Create VL3VEditField
app.VL3VEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.VL3VEditField.ValueDisplayFormat = '%e';
app.VL3VEditField.Position = [237 10 100 22];

% Create L3HLabel
app.L3HLabel = uilabel(
 app.CondensadoresybobinasdecompensacionPanel);
app.L3HLabel.HorizontalAlignment = 'right';
app.L3HLabel.Position = [13 14 37 15];
app.L3HLabel.Text = 'L3 [H]';

% Create L3HEditField
app.L3HEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.L3HEditField.ValueDisplayFormat = '%e';
app.L3HEditField.Position = [65 10 100 22];

% Create IC2ALabel
app.IC2ALabel = uilabel(
 app.CondensadoresybobinasdecompensacionPanel);
app.IC2ALabel.HorizontalAlignment = 'right';
app.IC2ALabel.Position = [369 82 41 15];
app.IC2ALabel.Text = 'IC2 [A]';

% Create IC2AEditField
app.IC2AEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.IC2AEditField.ValueDisplayFormat = '%e';
app.IC2AEditField.Position = [425 78 100 22];

% Create IC3AEditFieldLabel
app.IC3AEditFieldLabel = uilabel(
  app.CondensadoresybobinasdecompensacionPanel);
app.IC3AEditFieldLabel.HorizontalAlignment = 'right';
app.IC3AEditFieldLabel.Position = [369 49 41 15];
app.IC3AEditFieldLabel.Text = 'IC3 [A]';

% Create IC3AEditField
app.IC3AEditField = uieditfield(
  app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.IC3AEditField.ValueDisplayFormat = '%e';
app.IC3AEditField.Position = [425 45 100 22];

% Create IL3AEditFieldLabel
app.IL3AEditFieldLabel = uilabel(
```

```
 app.CondensadoresybobinasdecompensacionPanel);
app.IL3AEditFieldLabel.HorizontalAlignment = 'right';
app.IL3AEditFieldLabel.Position = [371 13 39 15];
app.IL3AEditFieldLabel.Text = 'IL3 [A]';

% Create IL3AEditField
app.IL3AEditField = uieditfield(
 app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.IL3AEditField.ValueDisplayFormat = '%e';
app.IL3AEditField.Position = [425 9 100 22];

% Create IC1AEditFieldLabel
app.IC1AEditFieldLabel = uilabel(
 app.CondensadoresybobinasdecompensacionPanel);
app.IC1AEditFieldLabel.HorizontalAlignment = 'right';
app.IC1AEditFieldLabel.Position = [369 117 41 15];
app.IC1AEditFieldLabel.Text = 'IC1 [A]';

% Create IC1AEditField
app.IC1AEditField = uieditfield(
app.CondensadoresybobinasdecompensacionPanel, 'numeric');
app.IC1AEditField.ValueDisplayFormat = '%e';
app.IC1AEditField.Position = [425 113 100 22];

% Create ParmetrosinicialesPanel
app.ParmetrosinicialesPanel = uipanel(app.DiseoTab);
app.ParmetrosinicialesPanel.Title = 'Parámetros iniciales';
app.ParmetrosinicialesPanel.Position = [28 17 511 609];

% Create PrimarioPanel
app.PrimarioPanel = uipanel(app.ParmetrosinicialesPanel);
app.PrimarioPanel.Title = 'Primario';
app.PrimarioPanel.Position = [12 328 241 187];

% Create maxN1Label
app.maxN1Label = uilabel(app.PrimarioPanel);
app.maxN1Label.HorizontalAlignment = 'right';
app.maxN1Label.Position = [66 45 47 15];
app.maxN1Label.Text = 'maxN1 ';

% Create maxN1EditField
app.maxN1EditField = uieditfield(
  app.PrimarioPanel, 'numeric');
app.maxN1EditField.Limits = [0 Inf];
app.maxN1EditField.Position = [126 41 100 22];
app.maxN1EditField.Value = 30;

% Create fmaxHzEditFieldLabel
```

```
app.fmaxHzEditFieldLabel = uilabel(app.PrimarioPanel);
app.fmaxHzEditFieldLabel.HorizontalAlignment = 'right';
app.fmaxHzEditFieldLabel.Position = [56 79 55 15];
app.fmaxHzEditFieldLabel.Text = 'fmax [Hz]';

% Create fmaxHzEditField
app.fmaxHzEditField = uieditfield(
   app.PrimarioPanel, 'numeric');
app.fmaxHzEditField.Limits = [0 Inf];
app.fmaxHzEditField.Position = [126 75 100 22];
app.fmaxHzEditField.Value = 85000;

% Create VccVEditFieldLabel
app.VccVEditFieldLabel = uilabel(app.PrimarioPanel);
app.VccVEditFieldLabel.HorizontalAlignment = 'right';
app.VccVEditFieldLabel.Position = [69 140 42 15];
app.VccVEditFieldLabel.Text = 'Vcc [V]';

% Create VccVEditField
app.VccVEditField = uieditfield(
   app.PrimarioPanel, 'numeric');
app.VccVEditField.ValueChangedFcn = createCallbackFcn(app,
  @VccVEditFieldValueChanged, true);
app.VccVEditField.Limits = [0 Inf];
app.VccVEditField.ValueDisplayFormat = '%.3f';
app.VccVEditField.Position = [126 136 100 22];
app.VccVEditField.Value = 650;

% Create V1VEditFieldLabel
app.V1VEditFieldLabel = uilabel(app.PrimarioPanel);
app.V1VEditFieldLabel.HorizontalAlignment = 'right';
app.V1VEditFieldLabel.Position = [73 109 37 15];
app.V1VEditFieldLabel.Text = 'V1 [V]';

% Create V1VEditField
app.V1VEditField = uieditfield(app.PrimarioPanel, 'numeric');
app.V1VEditField.Limits = [0 Inf];
app.V1VEditField.ValueDisplayFormat = '%.3f';
app.V1VEditField.Editable = 'off';
app.V1VEditField.Position = [126 105 100 22];

% Create DensiI1Amm2EditFieldLabel
app.DensiI1Amm2EditFieldLabel = uilabel(app.PrimarioPanel);
app.DensiI1Amm2EditFieldLabel.HorizontalAlignment = 'right';
app.DensiI1Amm2EditFieldLabel.Position = [11 14 100 15];
app.DensiI1Amm2EditFieldLabel.Text = 'Densi I 1 [A/mm2]';

% Create DensiI1Amm2EditField
```

```
app.DensiI1Amm2EditField = uieditfield(app.PrimarioPanel,
  'numeric');
app.DensiI1Amm2EditField.Limits = [0 Inf];
app.DensiI1Amm2EditField.Position = [126 10 100 22];
app.DensiI1Amm2EditField.Value = 4;

% Create GeomtricosPanel
app.GeomtricosPanel = uipanel(app.ParmetrosinicialesPanel);
app.GeomtricosPanel.Title = 'Geométricos';
app.GeomtricosPanel.Position = [12 14 479 305];

% Create a1mEditFieldLabel
app.a1mEditFieldLabel = uilabel(app.GeomtricosPanel);
app.a1mEditFieldLabel.HorizontalAlignment = 'right';
app.a1mEditFieldLabel.Position = [6 241 38 15];
app.a1mEditFieldLabel.Text = 'a1 [m]';

% Create a1mEditField
app.a1mEditField = uieditfield(app.GeomtricosPanel,
  'numeric');
app.a1mEditField.ValueChangedFcn = createCallbackFcn(app,
   @a1mEditFieldValueChanged, true);
app.a1mEditField.Limits = [0 Inf];
app.a1mEditField.ValueDisplayFormat = '%.4f';
app.a1mEditField.Position = [59 237 100 22];
app.a1mEditField.Value = 0.4;

% Create b1mEditFieldLabel
app.b1mEditFieldLabel = uilabel(app.GeomtricosPanel);
app.b1mEditFieldLabel.HorizontalAlignment = 'right';
app.b1mEditFieldLabel.Position = [7 209 38 15];
app.b1mEditFieldLabel.Text = 'b1 [m]';

% Create b1mEditField
app.b1mEditField = uieditfield(app.GeomtricosPanel,
 'numeric');
app.b1mEditField.ValueChangedFcn = createCallbackFcn(app,
 @b1mEditFieldValueChanged, true);
app.b1mEditField.Limits = [0 Inf];
app.b1mEditField.ValueDisplayFormat = '%.4f';
app.b1mEditField.Position = [60 205 100 22];
app.b1mEditField.Value = 0.8;

% Create a2mEditFieldLabel
app.a2mEditFieldLabel = uilabel(app.GeomtricosPanel);
app.a2mEditFieldLabel.HorizontalAlignment = 'right';
app.a2mEditFieldLabel.Position = [7 129 38 15];
app.a2mEditFieldLabel.Text = 'a2 [m]';
```

```
            % Create a2mEditField
            app.a2mEditField = uieditfield(app.GeomtricosPanel,
              'numeric');
            app.a2mEditField.ValueChangedFcn = createCallbackFcn(app,
                @a2mEditFieldValueChanged, true);
            app.a2mEditField.Limits = [0 Inf];
            app.a2mEditField.ValueDisplayFormat = '%.4f';
            app.a2mEditField.Position = [60 125 100 22];
            app.a2mEditField.Value = 0.4;

            % Create b2mEditFieldLabel
            app.b2mEditFieldLabel = uilabel(app.GeomtricosPanel);
            app.b2mEditFieldLabel.HorizontalAlignment = 'right';
            app.b2mEditFieldLabel.Position = [7 92 38 15];
            app.b2mEditFieldLabel.Text = 'b2 [m]';

            % Create b2mEditField
            app.b2mEditField = uieditfield(app.GeomtricosPanel,
'numeric');
            app.b2mEditField.ValueChangedFcn = createCallbackFcn(app,
@b2mEditFieldValueChanged, true);
            app.b2mEditField.Limits = [0 Inf];
            app.b2mEditField.ValueDisplayFormat = '%.4f';
            app.b2mEditField.Position = [60 88 100 22];
            app.b2mEditField.Value = 0.4;

            % Create emEditFieldLabel
            app.emEditFieldLabel = uilabel(app.GeomtricosPanel);
            app.emEditFieldLabel.HorizontalAlignment = 'right';
            app.emEditFieldLabel.Position = [13 57 31 15];
            app.emEditFieldLabel.Text = 'e [m]';

            % Create emEditField
            app.emEditField = uieditfield(app.GeomtricosPanel,
             'numeric');
            app.emEditField.ValueDisplayFormat = '%.4f';
            app.emEditField.Editable = 'off';
            app.emEditField.Position = [59 53 100 22];

            % Create hmEditFieldLabel
            app.hmEditFieldLabel = uilabel(app.GeomtricosPanel);
            app.hmEditFieldLabel.HorizontalAlignment = 'right';
            app.hmEditFieldLabel.Position = [13 18 31 15];
            app.hmEditFieldLabel.Text = 'h [m]';

            % Create hmEditField
            app.hmEditField = uieditfield(app.GeomtricosPanel,
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    'numeric');
app.hmEditField.Limits = [0 Inf];
app.hmEditField.ValueDisplayFormat = '%.4f';
app.hmEditField.Position = [59 14 100 22];
app.hmEditField.Value = 0.15;

% Create Button
app.Button = uibutton(app.GeomtricosPanel, 'push');
app.Button.ButtonPushedFcn = createCallbackFcn(app,
 @ButtonPushed, true);
app.Button.Icon = 'rectangulares.PNG';
app.Button.Position = [168 14 303 245];
app.Button.Text = '';

% Create cmEditFieldLabel
app.cmEditFieldLabel = uilabel(app.GeomtricosPanel);
app.cmEditFieldLabel.HorizontalAlignment = 'right';
app.cmEditFieldLabel.Position = [14 170 30 15];
app.cmEditFieldLabel.Text = 'c [m]';

% Create cmEditField
app.cmEditField = uieditfield(app.GeomtricosPanel,
 'numeric');
app.cmEditField.ValueDisplayFormat = '%.4f';
app.cmEditField.Editable = 'off';
app.cmEditField.Position = [59 166 100 22];

% Create BobinasrectangularesLabel
app.BobinasrectangularesLabel = uilabel(app.GeomtricosPanel);
app.BobinasrectangularesLabel.FontSize = 16;
app.BobinasrectangularesLabel.FontWeight = 'bold';
app.BobinasrectangularesLabel.Position = [234 263 178 20];
app.BobinasrectangularesLabel.Text = 'Bobinas rectangulares';

% Create SecundarioPanel
app.SecundarioPanel = uipanel(app.ParmetrosinicialesPanel);
app.SecundarioPanel.Title = 'Secundario';
app.SecundarioPanel.Position = [263 328 237 187];

% Create DensiI2Amm2EditFieldLabel
app.DensiI2Amm2EditFieldLabel = uilabel(app.SecundarioPanel);
app.DensiI2Amm2EditFieldLabel.HorizontalAlignment = 'right';
app.DensiI2Amm2EditFieldLabel.Position = [4 14 103 15];
app.DensiI2Amm2EditFieldLabel.Text = 'Densi I 2 [A/mm2] ';

% Create DensiI2Amm2EditField
app.DensiI2Amm2EditField = uieditfield(app.SecundarioPanel,
 'numeric');
```

```
app.DensiI2Amm2EditField.Limits = [0 Inf];
app.DensiI2Amm2EditField.Position = [122 10 100 22];
app.DensiI2Amm2EditField.Value = 4;

% Create VbateraVEditFieldLabel
app.VbateraVEditFieldLabel = uilabel(app.SecundarioPanel);
app.VbateraVEditFieldLabel.HorizontalAlignment = 'right';
app.VbateraVEditFieldLabel.Position = [36 106 71 15];
app.VbateraVEditFieldLabel.Text = 'V batería [V]';

% Create VbateraVEditField
app.VbateraVEditField = uieditfield(app.SecundarioPanel,
'numeric');
app.VbateraVEditField.Limits = [0 Inf];
app.VbateraVEditField.ValueDisplayFormat = '%.3f';
app.VbateraVEditField.Position = [122 102 100 22];
app.VbateraVEditField.Value = 350;

% Create maxN2EditFieldLabel
app.maxN2EditFieldLabel = uilabel(app.SecundarioPanel);
app.maxN2EditFieldLabel.HorizontalAlignment = 'right';
app.maxN2EditFieldLabel.Position = [63 45 44 15];
app.maxN2EditFieldLabel.Text = 'maxN2';

% Create maxN2EditField
app.maxN2EditField = uieditfield(app.SecundarioPanel,
  'numeric');
app.maxN2EditField.Limits = [0 Inf];
app.maxN2EditField.Position = [122 41 100 22];
app.maxN2EditField.Value = 30;

% Create PdeseadaWEditFieldLabel
app.PdeseadaWEditFieldLabel = uilabel(app.SecundarioPanel);
app.PdeseadaWEditFieldLabel.HorizontalAlignment = 'right';
app.PdeseadaWEditFieldLabel.Position = [23 75 84 15];
app.PdeseadaWEditFieldLabel.Text = 'P deseada [W]';

% Create PdeseadaWEditField
app.PdeseadaWEditField = uieditfield(app.SecundarioPanel,
 'numeric');
app.PdeseadaWEditField.Limits = [0 Inf];
app.PdeseadaWEditField.Position = [122 71 100 22];
app.PdeseadaWEditField.Value = 22000;

% Create GeomtricosPanel_2
app.GeomtricosPanel_2 = uipanel(app.ParmetrosinicialesPanel);
app.GeomtricosPanel_2.Title = 'Geométricos ';
app.GeomtricosPanel_2.Position = [11 8 488 310];
```

```
% Create hmEditField_2Label
app.hmEditField_2Label = uilabel(app.GeomtricosPanel_2);
app.hmEditField_2Label.HorizontalAlignment = 'right';
app.hmEditField_2Label.Position = [13 98 31 15];
app.hmEditField_2Label.Text = 'h [m]';

% Create hmEditField_2
app.hmEditField_2 = uieditfield(app.GeomtricosPanel_2,
 'numeric');
app.hmEditField_2.Limits = [0 Inf];
app.hmEditField_2.ValueDisplayFormat = '%.4f';
app.hmEditField_2.Position = [59 94 100 22];
app.hmEditField_2.Value = 0.2;

% Create Button_2
app.Button_2 = uibutton(app.GeomtricosPanel_2, 'push');
app.Button_2.ButtonPushedFcn = createCallbackFcn(app,
    @Button_2Pushed, true);
app.Button_2.Icon = 'circulares.PNG';
app.Button_2.Position = [168 19 303 245];
app.Button_2.Text = '';

% Create r2mLabel
app.r2mLabel = uilabel(app.GeomtricosPanel_2);
app.r2mLabel.HorizontalAlignment = 'right';
app.r2mLabel.Position = [10 166 35 15];
app.r2mLabel.Text = 'r2 [m]';

% Create r2mEditField_2
app.r2mEditField_2 = uieditfield(app.GeomtricosPanel_2,
   'numeric');
app.r2mEditField_2.Position = [60 162 100 22];

% Create r1mLabel
app.r1mLabel = uilabel(app.GeomtricosPanel_2);
app.r1mLabel.HorizontalAlignment = 'right';
app.r1mLabel.Position = [9 225 35 15];
app.r1mLabel.Text = 'r1 [m]';

% Create r1mEditField_2
app.r1mEditField_2 = uieditfield(app.GeomtricosPanel_2,
   'numeric');
app.r1mEditField_2.Position = [59 221 100 22];

% Create BobinascircularesLabel
app.BobinascircularesLabel = uilabel(app.GeomtricosPanel_2);
app.BobinascircularesLabel.FontSize = 16;
```

```
            app.BobinascircularesLabel.FontWeight = 'bold';
            app.BobinascircularesLabel.Position = [234 268 149 20];
            app.BobinascircularesLabel.Text = 'Bobinas circulares';

            % Create TopologiadeCompensacinButtonGroup
            app.TopologiadeCompensacinButtonGroup =
               uibuttongroup(app.ParmetrosinicialesPanel);
            app.TopologiadeCompensacinButtonGroup.TitlePosition =
              'centertop';
            app.TopologiadeCompensacinButtonGroup.Title = 'Topologia de
               Compensación';
            app.TopologiadeCompensacinButtonGroup.Position = [11 522 489
62];

            % Create CompensacinLabel
            app.CompensacinLabel =
               uilabel(app.TopologiadeCompensacinButtonGroup);
            app.CompensacinLabel.FontSize = 14;
            app.CompensacinLabel.Position = [315 14 100 18];
            app.CompensacinLabel.Text = 'Compensación';

            % Create KCFactorEditFieldLabel
            app.KCFactorEditFieldLabel =
                  uilabel(app.TopologiadeCompensacinButtonGroup);
            app.KCFactorEditFieldLabel.HorizontalAlignment = 'right';
            app.KCFactorEditFieldLabel.Position = [32 16 59 15];
            app.KCFactorEditFieldLabel.Text = 'KC Factor';

            % Create KCFactorEditField
            app.KCFactorEditField =
             uieditfield(app.TopologiadeCompensacinButtonGroup,
             'numeric');
            app.KCFactorEditField.ValueChangedFcn =
              createCallbackFcn(app, @KCFactorEditFieldValueChange,true);
            app.KCFactorEditField.Limits = [0 1];
            app.KCFactorEditField.Position = [106 12 100 22];

            % Create LimpiarButton_2
            app.LimpiarButton_2 = uibutton(app.DiseoTab, 'push');
            app.LimpiarButton_2.ButtonPushedFcn = createCallbackFcn(app,
              @LimpiarButtondisenPushed, true);
            app.LimpiarButton_2.Position = [1036 722 100 22];
            app.LimpiarButton_2.Text = 'Limpiar';

            % Create ExportaraSimulinkButton
            app.ExportaraSimulinkButton = uibutton(app.DiseoTab, 'push');
            app.ExportaraSimulinkButton.ButtonPushedFcn =
            createCallbackFcn(app, @ExportaraSimulinkButtonPushed, true);
```

```
app.ExportaraSimulinkButton.Position = [894.5 722 130 22];
app.ExportaraSimulinkButton.Text = 'Exportar a Simulink';

% Create CargarperfilButton
app.CargarperfilButton = uibutton(app.DiseoTab, 'push');
app.CargarperfilButton.ButtonPushedFcn =
createCallbackFcn(app, @CargarperfilButtonPushed, true);
app.CargarperfilButton.Position = [780 722 100 22];
app.CargarperfilButton.Text = 'Cargar perfil';

% Create StopButton
app.StopButton = uibutton(app.DiseoTab, 'push');
app.StopButton.ButtonPushedFcn = createCallbackFcn(app,
 @StopButtonPushed, true);
app.StopButton.Position = [782 751 98 22];
app.StopButton.Text = 'Stop';

% Create ExportaraWorkspaceButton
app.ExportaraWorkspaceButton = uibutton(app.DiseoTab,
  'push');
app.ExportaraWorkspaceButton.ButtonPushedFcn =
createCallbackFcn(app,@ExportaraWorkspaceButtonPushed, true);
app.ExportaraWorkspaceButton.Position = [892 751 135 22];
app.ExportaraWorkspaceButton.Text = 'Exportar a Workspace';

% Create ImportardesdeWokspceButton
app.ImportardesdeWokspceButton = uibutton(app.DiseoTab,
'push');
app.ImportardesdeWokspceButton.ButtonPushedFcn =
createCallbackFcn(app,@ImportardesdeWokspceButtonPushed,true);
app.ImportardesdeWokspceButton.Position = [562.5 751 205 22];
app.ImportardesdeWokspceButton.Text = 'Importar desde
 Wokspce';

% Create SelectordePerfilesPanel
app.SelectordePerfilesPanel = uipanel(app.DiseoTab);
app.SelectordePerfilesPanel.Title = 'Selector de Perfiles';
app.SelectordePerfilesPanel.Position = [28 639 260 125];

% Create NombredelPerfilEditFieldLabel
app.NombredelPerfilEditFieldLabel =
      uilabel(app.SelectordePerfilesPanel);
app.NombredelPerfilEditFieldLabel.HorizontalAlignment =
'right';
app.NombredelPerfilEditFieldLabel.Position = [25 66 100 15];
app.NombredelPerfilEditFieldLabel.Text = 'Nombre del Perfil';

% Create NombredelPerfilEditField
```

```
app.NombredelPerfilEditField =
 uieditfield(app.SelectordePerfilesPanel, 'text');
app.NombredelPerfilEditField.ValueChangedFcn=
  createCallbackFcn(app,NombredelPerfilEditFieldValueChanged,
   true);
app.NombredelPerfilEditField.Position = [140 62 100 22];
app.NombredelPerfilEditField.Value = 'SAE';

% Create PerfilesguardadosDropDownLabel
app.PerfilesguardadosDropDownLabel = uilabel(
  app.SelectordePerfilesPanel);
app.PerfilesguardadosDropDownLabel.HorizontalAlignment =
  'right';
app.PerfilesguardadosDropDownLabel.Position = [17 27 108 15];
app.PerfilesguardadosDropDownLabel.Text = 'Perfiles
  guardados';

% Create PerfilesguardadosDropDown
app.PerfilesguardadosDropDown =
  uidropdown(app.SelectordePerfilesPanel);
app.PerfilesguardadosDropDown.Items = {};
app.PerfilesguardadosDropDown.Editable = 'on';
app.PerfilesguardadosDropDown.BackgroundColor = [1 1 1];
app.PerfilesguardadosDropDown.Position = [140 23 100 22];
app.PerfilesguardadosDropDown.Value = {};

% Create imageButton
app.imageButton = uibutton(app.DiseoTab, 'state');
app.imageButton.ValueChangedFcn = createCallbackFcn(app,
  @imagebuu, true);
app.imageButton.Text = '';
app.imageButton.BackgroundColor = [0.9373 0.9373 0.9373];
app.imageButton.Position = [295 639 244 134];

% Create GrficasvariacinparmetrosTab
app.GrficasvariacinparmetrosTab = uitab(app.TabGroup);
app.GrficasvariacinparmetrosTab.Title = 'Gráficas variación
   parámetros';
app.GrficasvariacinparmetrosTab.Units = 'pixels';

% Create UIAxes
app.UIAxes = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes, 'Title');
xlabel(app.UIAxes, 'X');
ylabel(app.UIAxes, 'Y');
app.UIAxes.Box = 'on';
app.UIAxes.XGrid = 'on';
app.UIAxes.YGrid = 'on';
```

```
app.UIAxes.Position = [55 581 335 169];

% Create UIAxes2
app.UIAxes2 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes2, 'Title');
xlabel(app.UIAxes2, 'X');
ylabel(app.UIAxes2, 'Y');
app.UIAxes2.Box = 'on';
app.UIAxes2.XGrid = 'on';
app.UIAxes2.YGrid = 'on';
app.UIAxes2.Position = [55 407 335 169];

% Create UIAxes3
app.UIAxes3 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes3, 'Title');
xlabel(app.UIAxes3, 'X');
ylabel(app.UIAxes3, 'Y');
app.UIAxes3.Box = 'on';
app.UIAxes3.XGrid = 'on';
app.UIAxes3.YGrid = 'on';
app.UIAxes3.Position = [55 217 335 169];

% Create UIAxes_2
app.UIAxes_2 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes_2, 'Title');
xlabel(app.UIAxes_2, 'X');
ylabel(app.UIAxes_2, 'Y');
app.UIAxes_2.Box = 'on';
app.UIAxes_2.XGrid = 'on';
app.UIAxes_2.YGrid = 'on';
app.UIAxes_2.Position = [430 581 335 169];

% Create UIAxes2_2
app.UIAxes2_2 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes2_2, 'Title');
xlabel(app.UIAxes2_2, 'X');
ylabel(app.UIAxes2_2, 'Y');
app.UIAxes2_2.Box = 'on';
app.UIAxes2_2.XGrid = 'on';
app.UIAxes2_2.YGrid = 'on';
app.UIAxes2_2.Position = [433 413 335 169];

% Create UIAxes3_2
app.UIAxes3_2 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes3_2, 'Title');
xlabel(app.UIAxes3_2, 'X');
ylabel(app.UIAxes3_2, 'Y');
app.UIAxes3_2.Box = 'on';
```

```
app.UIAxes3_2.XGrid = 'on';
app.UIAxes3_2.YGrid = 'on';
app.UIAxes3_2.Position = [433 217 335 169];

% Create UIAxes_3
app.UIAxes_3 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes_3, 'Title');
xlabel(app.UIAxes_3, 'X');
ylabel(app.UIAxes_3, 'Y');
app.UIAxes_3.Box = 'on';
app.UIAxes_3.XGrid = 'on';
app.UIAxes_3.YGrid = 'on';
app.UIAxes_3.Position = [790 581 335 169];

% Create UIAxes2_3
app.UIAxes2_3 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes2_3, 'Title');
xlabel(app.UIAxes2_3, 'X');
ylabel(app.UIAxes2_3, 'Y');
app.UIAxes2_3.Box = 'on';
app.UIAxes2_3.XGrid = 'on';
app.UIAxes2_3.YGrid = 'on';
app.UIAxes2_3.Position = [790 407 335 169];

% Create UIAxes3_3
app.UIAxes3_3 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes3_3, 'Title');
xlabel(app.UIAxes3_3, 'X');
ylabel(app.UIAxes3_3, 'Y');
app.UIAxes3_3.Box = 'on';
app.UIAxes3_3.XGrid = 'on';
app.UIAxes3_3.YGrid = 'on';
app.UIAxes3_3.Position = [790 217 335 169];

% Create UIAxes4
app.UIAxes4 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes4, 'Title');
xlabel(app.UIAxes4, 'X');
ylabel(app.UIAxes4, 'Y');
app.UIAxes4.Box = 'on';
app.UIAxes4.XGrid = 'on';
app.UIAxes4.YGrid = 'on';
app.UIAxes4.Position = [55 30 335 169];

% Create UIAxes4_2
app.UIAxes4_2 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes4_2, 'Title');
xlabel(app.UIAxes4_2, 'X');
```

```
ylabel(app.UIAxes4_2, 'Y');
app.UIAxes4_2.Box = 'on';
app.UIAxes4_2.XGrid = 'on';
app.UIAxes4_2.YGrid = 'on';
app.UIAxes4_2.Position = [430 30 335 169];

% Create UIAxes4_3
app.UIAxes4_3 = uiaxes(app.GrficasvariacinparmetrosTab);
title(app.UIAxes4_3, 'Title');
xlabel(app.UIAxes4_3, 'X');
ylabel(app.UIAxes4_3, 'Y');
app.UIAxes4_3.Box = 'on';
app.UIAxes4_3.XGrid = 'on';
app.UIAxes4_3.YGrid = 'on';
app.UIAxes4_3.Position = [790 30 335 169];

% Create AnlisiscomparativoTab
app.AnlisiscomparativoTab = uitab(app.TabGroup);
app.AnlisiscomparativoTab.Title = 'Análisis comparativo';
app.AnlisiscomparativoTab.Units = 'pixels';

% Create UIAxes5
app.UIAxes5 = uiaxes(app.AnlisiscomparativoTab);
xlabel(app.UIAxes5, 'X');
ylabel(app.UIAxes5, 'Y');
app.UIAxes5.Box = 'on';
app.UIAxes5.XGrid = 'on';
app.UIAxes5.YGrid = 'on';
app.UIAxes5.Position = [360 151 788 594];

% Create RepresentarButton_2
app.RepresentarButton_2 = uibutton(app.AnlisiscomparativoTab,
  'push');
app.RepresentarButton_2.ButtonPushedFcn =
createCallbackFcn(app, @RepresentarButton_2Pushed, true);
app.RepresentarButton_2.Position = [46 294 100 22];
app.RepresentarButton_2.Text = 'Representar';

% Create AnlisisComparativoLabel
app.AnlisisComparativoLabel =
  uilabel(app.AnlisiscomparativoTab);
app.AnlisisComparativoLabel.FontSize = 18;
app.AnlisisComparativoLabel.FontWeight = 'bold';
app.AnlisisComparativoLabel.Position = [46 722 191 23];
app.AnlisisComparativoLabel.Text = 'Análisis Comparativo';

% Create LimpiarButton
app.LimpiarButton = uibutton(app.AnlisiscomparativoTab,
```

```
            'push');
            app.LimpiarButton.ButtonPushedFcn = createCallbackFcn(app,
             @LimpiarButtonPushed, true);
            app.LimpiarButton.Position = [206 294 100 22];
            app.LimpiarButton.Text = 'Limpiar';

            % Create EjedeordenadasizquierdoPanel
            app.EjedeordenadasizquierdoPanel =
             uipanel(app.AnlisiscomparativoTab);
            app.EjedeordenadasizquierdoPanel.Title = 'Eje  de ordenadas
              izquierdo';
            app.EjedeordenadasizquierdoPanel.Position = [46 591 260 101];

            % Create Perfil1DropDownLabel
            app.Perfil1DropDownLabel =
              uilabel(app.EjedeordenadasizquierdoPanel);
            app.Perfil1DropDownLabel.HorizontalAlignment = 'right';
            app.Perfil1DropDownLabel.Position = [75 52 43 15];
            app.Perfil1DropDownLabel.Text = 'Perfil 1';

            % Create Perfil1DropDown
            app.Perfil1DropDown =
                uidropdown(app.EjedeordenadasizquierdoPanel);
            app.Perfil1DropDown.Items = {};
            app.Perfil1DropDown.ValueChangedFcn = createCallbackFcn(app,
              @Perfil1DropDownValueChanged, true);
            app.Perfil1DropDown.Position = [133 48 100 22];
            app.Perfil1DropDown.Value = {};

            % Create DatosdelPerfil1DropDownLabel
            app.DatosdelPerfil1DropDownLabel =
               uilabel(app.EjedeordenadasizquierdoPanel);
            app.DatosdelPerfil1DropDownLabel.HorizontalAlignment =
               'right';
            app.DatosdelPerfil1DropDownLabel.Position = [17 20 101 15];
            app.DatosdelPerfil1DropDownLabel.Text = 'Datos del Perfil
1';

            % Create DatosdelPerfil1DropDown
            app.DatosdelPerfil1DropDown =
                uidropdown(app.EjedeordenadasizquierdoPanel);
            app.DatosdelPerfil1DropDown.Items = {};
            app.DatosdelPerfil1DropDown.Position = [133 16 100 22];
            app.DatosdelPerfil1DropDown.Value = {};

            % Create EjedeordenadasderechoPanel
            app.EjedeordenadasderechoPanel =
              uipanel(app.AnlisiscomparativoTab);
```

```
            app.EjedeordenadasderechoPanel.Title = 'Eje de ordenadas
               derecho';
            app.EjedeordenadasderechoPanel.Position = [46 465 260 100];

            % Create Perfil2Label
            app.Perfil2Label = uilabel(app.EjedeordenadasderechoPanel);
            app.Perfil2Label.HorizontalAlignment = 'right';
            app.Perfil2Label.Position = [72 54 46 15];
            app.Perfil2Label.Text = 'Perfil  2';

            % Create Perfil2DropDown
            app.Perfil2DropDown =
                 uidropdown(app.EjedeordenadasderechoPanel);
            app.Perfil2DropDown.Items = {};
            app.Perfil2DropDown.ValueChangedFcn = createCallbackFcn(app,
              @Perfil2DropDownValueChanged, true);
            app.Perfil2DropDown.Position = [133 50 100 22];
            app.Perfil2DropDown.Value = {};

            % Create DatosdelPerfil2DropDownLabel
            app.DatosdelPerfil2DropDownLabel =
               uilabel(app.EjedeordenadasderechoPanel);
            app.DatosdelPerfil2DropDownLabel.HorizontalAlignment =
               'right';
            app.DatosdelPerfil2DropDownLabel.Position = [17 20 101 15];
            app.DatosdelPerfil2DropDownLabel.Text = 'Datos del Perfil 2
';

            % Create DatosdelPerfil2DropDown
            app.DatosdelPerfil2DropDown =
              uidropdown(app.EjedeordenadasderechoPanel);
            app.DatosdelPerfil2DropDown.Items = {};
            app.DatosdelPerfil2DropDown.Position = [133 16 100 22];
            app.DatosdelPerfil2DropDown.Value = {};

            % Create EjedeabcisasPanel
            app.EjedeabcisasPanel = uipanel(app.AnlisiscomparativoTab);
            app.EjedeabcisasPanel.Title = 'Eje de abcisas';
            app.EjedeabcisasPanel.Position = [46 355 260 70];

            % Create DatosEjedeabcisasDropDownLabel
            app.DatosEjedeabcisasDropDownLabel =
               uilabel(app.EjedeabcisasPanel);
            app.DatosEjedeabcisasDropDownLabel.HorizontalAlignment =
                'right';
            app.DatosEjedeabcisasDropDownLabel.Position = [9 19 120 15];
            app.DatosEjedeabcisasDropDownLabel.Text = 'Datos Eje de
          abcisas';
```

```
            % Create DatosEjedeabcisasDropDown
            app.DatosEjedeabcisasDropDown =
              uidropdown(app.EjedeabcisasPanel);
            app.DatosEjedeabcisasDropDown.Items = {};
            app.DatosEjedeabcisasDropDown.Position = [144 15 100 22];
            app.DatosEjedeabcisasDropDown.Value = {};

            % Create RepresentarenunanuevaventanaButton
            app.RepresentarenunanuevaventanaButton =
               uibutton(app.AnlisiscomparativoTab, 'push');
            app.RepresentarenunanuevaventanaButton.ButtonPushedFcn =
            createCallbackFcn(app,
            @RepresentarenunanuevaventanaButtonPushed, true);
            app.RepresentarenunanuevaventanaButton.Position = [45.5 255
              260 22];
            app.RepresentarenunanuevaventanaButton.Text = 'Representar en
                una nueva ventana';
        end
    end

    methods (Access = public)

        % Construct app
        function app = SistemasWPT()

            % Create and configure components
            createComponents(app)

            % Register the app with App Designer
            registerApp(app, app.DiseadordesistemasWPTUIFigure)

            % Execute the startup function
            runStartupFcn(app, @startupFcn)

            if nargout == 0
                clear app
            end
        end

        % Code that executes before app deletion
        function delete(app)

            % Delete UIFigure when app is deleted
            delete(app.DiseadordesistemasWPTUIFigure)
        end
    end
end
```

A.3 Fichero .m CompG

```
classdef CompG
    %CompenG Calcula los parámetros óptimos para coordenadas circulares y
    %rectangulares además en el caso de tener éxito guarda las graficas
    %correspondientes a variación de parámetros
    properties
        %Variables de entrada electricas
        %

        Vcc; %tension de alimentacion del bus
        Vbat;%tension deseada en bornes de la bateria
        V1; %tension eficaz de alimentacion del circuito
        fmax; %frecuencia maxima
        maxN1;%Numero maximo de espiras en el primario
        maxN2; %Numero maximo de espiras en el secundario
        Pdeseada; %Potencia a transmitir deseada
        Vdeseada;%Tension deseada en bornes de la bateria coincidente con
vbat
        densi1;%Densidad de corriente maxima para el bobinado del
primario
        densi2;%Densidad de corriente maxima para el bobinado del
secundario

        %Variables de entrada ,parametros geometricos
        %
        h; %Distancia entre bobinas
        a1;% Alto bobina primario
        b1;% Ancho bobina primario
        a2;% Alto bobina secundario
        b2;% Ancho bobina secundario
        c;% Distancia relativa primario secundario
        e;% Distancia relativa secundario primario
        KC;% Factor KC
        KC1;%   Factor KC1
        r1;% Radio bobina primario
        r2;% Radio bobina secundario

        %Variables de salida
        %
        Comtype;%Tipo de compensacion
        opt;%Vector con los valores de N° espiras 1° y 2°
        f0;% Frecuencia final del sistema
        VC1;% Tension condensador C1
        VC2;% Tension condensador C2
        VC3;% Tension condensador C3
        VL3;% Tension inductancia L3
```

```
C1; %Condensador de acopo 1
C2; %Condesador de acoblo 2
C3; %Condensador de acoplo3
S1;%Seccion del primario de la bobina
S2;%Seccion del secundario de la bobina
I1;% Intensidad I1
I2;% Intensidad I2
IC3;%  Intensidad por el condensaor C3
IC2;%  Intensidad por el condensaor C2
IC1;%  Intensidad por el condensaor C1
Ip;%   Intensidad por el primario
IL3;%Intensidad por la inductancia L3
PL;% Potencia cedida por el secundario
rend;%Rendimiento
densidadI1;%Desidad de corriente calculada primario
densidadI2;%Desidad de corriente calculada secundario
ff;%
seccion1;
seccion2;%
fun;%
Z2f;%
Z1f;%
ZL;%
densiI1;%
densiI2;%
L1;%Inductancia L1
L2;%Inductancia L2
L3;%Inductancia L3
Pcarga;%
P1; % Potencia absorbida por el primario
FA; %
Qp; %Factor calidad primario
Qs; %Factor calidad secundario
M;% Factor de induccion Mutua
k; %
R1;%Resistencia R1
R2;%Resistencia R2
RL;% Resistencia RL

%Variables auxiliares
%
Incvar;
Vartoinc;
Sol;
Gtype;

% Variables para salidas de graficas(Variacion de parametros)
%
```

```
distancia;%valores para representar distancia
modI1_distancia;
Argumentoredondeado_distancia;
VL_distancia;
modI2_distancia;
PL_distancia;
P1_distancia;
rend_distancia;
modIp_distancia;
modIc3_distancia;
VC1_distancia;
VC2_distancia;

%
f;%valores para representar frecuencia
modI1_freq;
A2rgumentoredondeado_freq;
VL_freq;
modI2_freq;
PL_freq;
P1_freq;
rend_freq;
modIp_freq;
modIc3_freq;
VC1_freq;
VC2_freq;

%
posyrelativa;%valores para representar posicion relativa
modI1_pos;
A2rgumentoredondeado_pos;
VL_pos;
modI2_pos;
PL_pos;
P1_pos
rend_pos;
modIp_pos;
modIc3_pos;
VC1_pos;
VC2_pos;

%
variacioncarga; %valores para representar nivel de carga
modI1_carga;
A2rgumentoredondeado_carga;
VL_carga;
modI2_carga;
PL_carga;
```

```
        P1_carga;
        rend_carga;
        modIp_carga;
        modIc3_carga;
        VC1_carga;
        VC2_carga;

    end

    methods
        function  obj =
CoGrec(obj,app,Vcc,Vbat,h,a1,b1,a2,b2,fmax,densi1,densi2,maxN1,maxN2,Pdes
eada,Vdeseada,KC)
            %CoGrec calculara los parametros de dise□o para bobinas
            %rectangulares.

            obj.Gtype='rec';
            obj.Vcc=Vcc;
            V1=2*sqrt(2)*Vcc/pi();
            obj.Vbat=Vbat;
            obj.V1=V1;
            obj.densi1=densi1;
            obj.densi2=densi2;
            obj.KC=KC;
            if KC==0
                KC1=1;
            elseif KC==1
                KC1=1e15;
            else
                KC1=0.25;
            end
            obj.KC1=KC1;
            if obj.KC==0

                obj.Comtype='SS';
            end

            if obj.KC==1
                obj.Comtype='PS';

            end
            if obj.KC~=1 && obj.KC~=0
                obj.Comtype='SPS';
            end
            obj.h=h;
            obj.maxN1=maxN1;
            obj.maxN2=maxN2;
            obj.a1=a1;
```

```
            obj.b1=b1;
            obj.a2=a2;
            obj.b2=b2;
            obj.c=-(a1-a2)/2;
            obj.e=(b1-b2)/2;
            obj.fmax=fmax;
            obj.Pdeseada= Pdeseada;
            obj.Vdeseada=Vdeseada;
            c=-(a1-a2)/2;
            e=(b1-b2)/2;
            RL=Vdeseada^2/Pdeseada;
            obj.RL=RL;


            %calculo para las distintas combinaciones de espiras
geometria cuadrada
            %Inicializaci▯n de variables con la intencion de aumentar la
            %velociadad

            seccion1=zeros(maxN1,maxN2);
            seccion2=zeros(maxN1,maxN2);
            %             cantcobre1=zeros(maxN1,maxN2);
            %             cantcobre2=zeros(maxN1,maxN2);
            %             cobretotal=zeros(maxN1,maxN2);
            r01=zeros(maxN1,maxN2);
            r02=zeros(maxN1,maxN2);
            L1=zeros(maxN1,maxN2);
            L2=zeros(maxN1,maxN2);
            M1=zeros(maxN1,maxN2);
            M2=zeros(maxN1,maxN2);
            M3=zeros(maxN1,maxN2);
            M11=zeros(maxN1,maxN2);
            M21=zeros(maxN1,maxN2);
            M31=zeros(maxN1,maxN2);
            Mh=zeros(maxN1,maxN2);
            M4=zeros(maxN1,maxN2);
            M5=zeros(maxN1,maxN2);
            M6=zeros(maxN1,maxN2);
            M41=zeros(maxN1,maxN2);
            M51=zeros(maxN1,maxN2);
            M61=zeros(maxN1,maxN2);
            Mv=zeros(maxN1,maxN2);
            M=zeros(maxN1,maxN2);
            k=zeros(maxN1,maxN2);
            R1=zeros(maxN1,maxN2);
            R2=zeros(maxN1,maxN2);
            % RL=zeros(maxN1,maxN2);
            ff=zeros(maxN1,maxN2);
```

```
om0=zeros(maxN1,maxN2);
f0=zeros(maxN1,maxN2);
C2=zeros(maxN1,maxN2);
C3=zeros(maxN1,maxN2);
Z2f=zeros(maxN1,maxN2);
Z1f=zeros(maxN1,maxN2);
ZL=zeros(maxN1,maxN2);
KM=zeros(maxN1,maxN2);
Z11=zeros(maxN1,maxN2);
ZTPS=zeros(maxN1,maxN2);
imagZTPS=zeros(maxN1,maxN2);
C1=zeros(maxN1,maxN2);
ZT=zeros(maxN1,maxN2);
%             A2=zeros(maxN1,maxN2);
%             A2grados=zeros(maxN1,maxN2);
%             A2redondeado=zeros(maxN1,maxN2);
I1=zeros(maxN1,maxN2);
Vp=zeros(maxN1,maxN2);
Ic3=zeros(maxN1,maxN2);
Ip=zeros(maxN1,maxN2);
I2=zeros(maxN1,maxN2);
densiI1=zeros(maxN1,maxN2);
densiI2=zeros(maxN1,maxN2);
PL=zeros(maxN1,maxN2);
VL=zeros(maxN1,maxN2);
VC10=zeros(maxN1,maxN2);
VC20=zeros(maxN1,maxN2);
Y11=zeros(maxN1,maxN2);
P1=zeros(maxN1,maxN2);
rend=zeros(maxN1,maxN2);
FA=zeros(maxN1,maxN2);
Qp=zeros(maxN1,maxN2);
Qs=zeros(maxN1,maxN2);
fun=zeros(maxN1,maxN2);
relQ=zeros(maxN1,maxN2);
VL3=zeros(maxN1,maxN2);
imagZT=zeros(maxN1,maxN2);
VC3=zeros(maxN1,maxN2);
Ztotal=zeros(maxN1,maxN2);
% L3=zeros(maxN1,maxN2);
Argumentogrados=zeros(maxN1,maxN2);
Argumentoredondeado=zeros(maxN1,maxN2);



ya=0;
salta=0;
rendimientodeseado=1;
```

```
while ya<1

    for N1=1:maxN1


        if salta<1
            app.N1EditField.Value=N1;
        end
        for N2=1:maxN2

            if Pdeseada< 750
                seccion1(N1,N2)=0.1e-6;
                seccion2(N1,N2)=0.1e-6;

            else
                seccion1(N1,N2)=1e-6;
                seccion2(N1,N2)=1e-6;
            end
            seccioncorrecta=0;
            if salta<1
                app.N2EditField.Value=N2;
            end

            %Condicion para acabar de golpe
            if salta==1
                N1=maxN1;
                N2=maxN2;
            end

            while seccioncorrecta<1 && salta<1
                if app.stop
                    app.N1EditField.Value=N1;
                    app.N2EditField.Value=N2;
                    disp('interrumpido')
                    return
                end
                pause(0.0000001);


                r01(N1,N2)=sqrt(N1*seccion1(N1,N2)/pi);
                r02(N1,N2)=sqrt(N2*seccion2(N1,N2)/pi);
                dp1=sqrt(a1^2+b1^2);
                dp2=sqrt(a2^2+b2^2);
                L1(N1,N2)=1*4e-
7*(N1^2)*(a1*log(2*a1*b1/(r01(N1
,N2)*(a1+dp1)))+b1*log(2*a1*b1/(r01(N1,N2)*(b1+dp1)))-2*(a1+b1-
dp1)+0.25*(a1+b1));
```

```
                        L2(N1,N2)=1*4e-
7*(N2^2)*(a2*log(2*a2*b2/(r02(N1,N2)*(a2+dp2)))+b2*log(2*a2*b2/(r02(N1,N2
)*(b2+dp2)))-2*(a2+b2-dp2)+0.25*(a2+b2));

                        %inductancia mutua bobinas distintas
                        %M tramos horizontales
                        M1(N1,N2)=N1*N2*1e-7*((a1-a2-c)*log(((a1-a2-
c)+sqrt(h^2+(e-b1)^2+(a1-a2-c)^2))/((a1-a2-c)+sqrt(h^2+e^2+(a1-a2-
c)^2)))+(a1-c)*log(((a1-c)+sqrt(h^2+e^2+(a1-c)^2))/((a1-c)+sqrt(h^2+(e-
b1)^2+(a1-c)^2))));
                        M2(N1,N2)=N1*N2*1e-7*((c*log(((-
c)+sqrt(h^2+e^2+c^2))/((-c)+sqrt(h^2+c^2+(e-b1)^2))))+((a2+c)*log(((-a2-
c)+sqrt(h^2+(e-b1)^2+(a2+c)^2))/((-a2-c)+sqrt(h^2+(a2+c)^2+e^2)))));
                        M3(N1,N2)=N1*N2*1e-7*(sqrt(h^2+e^2+(a1-a2-
c)^2)-sqrt(h^2+e^2+(a1-c)^2)-
sqrt(h^2+e^2+(a2+c)^2)+sqrt(h^2+e^2+c^2)+sqrt(h^2+(e-b1)^2+(a1-c)^2)-
sqrt(h^2+(e-b1)^2+(a1-a2-c)^2)+sqrt(h^2+(e-b1)^2+(a2+c)^2)-sqrt(h^2+(e-
b1)^2+c^2));

                        M11(N1,N2)=N1*N2*1e-7*((a1-a2-c)*log(((a1-a2-
c)+sqrt(h^2+(e+b2-b1)^2+(a1-a2-c)^2))/((a1-a2-c)+sqrt(h^2+(b2+e)^2+(a1-
a2-c)^2)))+(a1-c)*log(((a1-c)+sqrt(h^2+(b2+e)^2+(a1-c)^2))/((a1-
c)+sqrt(h^2+(e+b2-b1)^2+(a1-c)^2))));
                        M21(N1,N2)=N1*N2*1e-7*((c*log(((-
c)+sqrt(h^2+(b2+e)^2+c^2))/((-c)+sqrt(h^2+c^2+(e+b2-
b1)^2))))+((a2+c)*log(((-a2-c)+sqrt(h^2+(e+b2-b1)^2+(a2+c)^2))/((-a2-
c)+sqrt(h^2+(a2+c)^2+(b2+e)^2)))));
                        M31(N1,N2)=N1*N2*1e-7*(sqrt(h^2+(b2+e)^2+(a1-
a2-c)^2)-sqrt(h^2+(b2+e)^2+(a1-c)^2)-
sqrt(h^2+(b2+e)^2+(a2+c)^2)+sqrt(h^2+(b2+e)^2+c^2)+sqrt(h^2+(e+b2-
b1)^2+(a1-c)^2)-sqrt(h^2+(e+b2-b1)^2+(a1-a2-c)^2)+sqrt(h^2+(e+b2-
b1)^2+(a2+c)^2)-sqrt(h^2+(e+b2-b1)^2+c^2));


                        Mh(N1,N2)=(M1(N1,N2)-M11(N1,N2)+M2(N1,N2)-
M21(N1,N2)+M3(N1,N2)-M31(N1,N2));
                        %M tramos verticales

                        M4(N1,N2)=N1*N2*1e-7*((b1-b2-e)*log(((b1-b2-
e)+sqrt(h^2+(c-a1)^2+(b1-b2-e)^2))/((b1-b2-e)+sqrt(h^2+c^2+(b1-b2-
e)^2)))+(b1-e)*log(((b1-e)+sqrt(h^2+c^2+(b1-e)^2))/((b1-e)+sqrt(h^2+(c-
a1)^2+(b1-e)^2))));
                        M5(N1,N2)=N1*N2*1e-7*((e*log(((-
e)+sqrt(h^2+c^2+e^2))/((-e)+sqrt(h^2+e^2+(c-a1)^2))))+((b2+e)*log(((-b2-
e)+sqrt(h^2+(c-a1)^2+(b2+e)^2))/((-b2-e)+sqrt(h^2+(b2+e)^2+c^2)))));
                        M6(N1,N2)=N1*N2*1e-7*(sqrt(h^2+c^2+(b1-b2-
e)^2)-sqrt(h^2+c^2+(b1-e)^2)-
sqrt(h^2+c^2+(b2+e)^2)+sqrt(h^2+c^2+e^2)+sqrt(h^2+(c-a1)^2+(b1-e)^2)-
```

```
sqrt(h^2+(c-a1)^2+(b1-b2-e)^2)+sqrt(h^2+(c-a1)^2+(b2+e)^2)-sqrt(h^2+(c-
a1)^2+e^2));

                            M41(N1,N2)=N1*N2*1e-7*((b1-b2-e)*log(((b1-b2-
e)+sqrt(h^2+(c+a2-a1)^2+(b1-b2-e)^2))/((b1-b2-e)+sqrt(h^2+(c+a2)^2+(b1-
b2-e)^2)))+(b1-e)*log(((b1-e)+sqrt(h^2+(c+a2)^2+(b1-e)^2))/((b1-
e)+sqrt(h^2+(c+a2-a1)^2+(b1-e)^2))));
                            M51(N1,N2)=N1*N2*1e-7*((e*log(((-
e)+sqrt(h^2+(c+a2)^2+e^2))/((-e)+sqrt(h^2+e^2+(c+a2-
a1)^2))))+((b2+e)*log(((-b2-e)+sqrt(h^2+(c+a2-a1)^2+(b2+e)^2))/((-b2-
e)+sqrt(h^2+(b2+e)^2+(c+a2)^2)))));
                            M61(N1,N2)=N1*N2*1e-7*(sqrt(h^2+(c+a2)^2+(b1-
b2-e)^2)-sqrt(h^2+(c+a2)^2+(b1-e)^2)-
sqrt(h^2+(c+a2)^2+(b2+e)^2)+sqrt(h^2+(c+a2)^2+e^2)+sqrt(h^2+(c+a2-
a1)^2+(b1-e)^2)-sqrt(h^2+(c+a2-a1)^2+(b1-b2-e)^2)+sqrt(h^2+(c+a2-
a1)^2+(b2+e)^2)-sqrt(h^2+(c+a2-a1)^2+e^2));


                            Mv(N1,N2)=(M4(N1,N2)-M41(N1,N2)+M5(N1,N2)-
M51(N1,N2)+M6(N1,N2)-M61(N1,N2));
                            %Coeficiente de inducci?n mutua definitivo
                            M(N1,N2)=1*(Mh(N1,N2)+Mv(N1,N2)); %antes
neniamos uno de 0.84 en vez de 1
                            %factor de acoplamiento
                            k(N1,N2)=M(N1,N2)/
(sqrt(L1(N1,N2)*L2(N1,N2)));
                            %resistencias
                            R1(N1,N2)=(1/57)*N1*2*(b1+a1)/
(seccion1(N1,N2)*1e6);%podemos aplicar factores para incrementarlas
                            R2(N1,N2)=(1/57)*N2*2*(b2+a2)/
(seccion2(N1,N2)*1e6);

                            %inicializaci?n de variables
                            ff(N1,N2)=1;
                            Pcarga=100000;
                            frecuencia=1000;
                            while  Pcarga>Pdeseada
                                %frecuencia de tragajo
                                om0(N1,N2)=(ff(N1,N2)*sqrt(
R1(N1,N2)*(R2(N1,N2)+RL)))/M(N1,N2);
                                f0(N1,N2)=om0(N1,N2)/(2*pi);
                                %condensadores de acoplo
                                C2(N1,N2)=1/((L2(N1,N2))*(om0(N1,N2)^2));
                                C3(N1,N2)=KC*(L2(N1,N2)*C2(N1,N2))/
(L1(N1,N2)+(M(N1,N2)^4/(L1(N1,N2)*L2(N1,N2)*C2(N1,N2)*RL^2)));
                                Z2f(N1,N2)=R2(N1,N2)+j*(
L2(N1,N2)*om0(N1,N2)-1/(C2(N1,N2)*om0(N1,N2)));
                                Z1f(N1,N2)=R1(N1,N2)+
```

```
j*L1(N1,N2)*om0(N1,N2);
                                ZL=RL;
                                %c?lculo de la potencia en la carga
                                KM(N1,N2)=(om0(N1,N2)*M(N1,N2))^2;
                                %impedancia total de secundario vista
desde el primario
                                Z11(N1,N2)=Z1f(N1,N2)+KM(N1,N2)/
(Z2f(N1,N2)+ZL);
                                ZTPS(N1,N2)=(Z11(N1,N2)/
(1+Z11(N1,N2)*j*om0(N1,N2)*C3(N1,N2)));
                                imagZTPS(N1,N2)=imag(ZTPS(N1,N2));
                                C1(N1,N2)=KC1*1/
(imagZTPS(N1,N2)*om0(N1,N2));
                                ZT(N1,N2)=(Z11(N1,N2)/(1+Z11(N1,
N2)*j*om0(N1,N2)*C3(N1,N2))+1/(j*om0(N1,N2)*C1(N1,N2)));
                                imagZT(N1,N2)=imag(ZT(N1,N2));
                                L3(N1,N2)=-imagZT(N1,N2)/om0(N1,N2);
                                Ztotal(N1,N2)=ZT(N1,N2)+j*om0(N1,N2)
*L3(N1*N2);
                                %intensaidades de primario y secundario
                                Argumentogrados(N1,N2)=-
atan(imag(Ztotal(N1,N2))/real(Ztotal(N1,N2)))*360/(2*pi);
                                Argumentoredondeado(N1,N2)=round(
Argumentogrados(N1,N2));
                                I1(N1,N2)=V1/Ztotal(N1,N2);
                                Vp(N1,N2)=V1-
I1(N1,N2)*(1/(j*om0(N1,N2)*C1(N1,N2)))-I1(N1,N2)*j*L3(N1,N2)*om0(N1,N2);
                                Ic3(N1,N2)=Vp(N1,N2)*j
*om0(N1,N2)*C3(N1,N2);
                                VL3(N1,N2)=L3(N1,N2)*om0(N1,N2)*
I1(N1,N2);
                                Ip(N1,N2)=I1(N1,N2)-Ic3(N1,N2);
                                I2(N1,N2)=Ip(N1,N2)*j*om0(N1,N2)
*M(N1,N2)/(Z2f(N1,N2)+ZL);
                                densiI1(N1,N2)=(abs(Ip(N1,N2))/
seccion1(N1,N2))*1e-6;
                                densiI2(N1,N2)=(abs(I2(N1,N2))/
seccion2(N1,N2))*1e-6;


                                %potencia en la carga
                                PL(N1,N2)=RL*(abs(I2(N1,N2))^2);
                                VL(N1,N2)=I2(N1,N2)*ZL;
                                % tensi?n en los condensadores de acoplo
de primario y secundario
                                VC10(N1,N2)=I1(N1,N2)*(1/
(j*C1(N1,N2)*om0(N1,N2)));
                                VC20(N1,N2)=I2(N1,N2)*(1/
```

```
(j*C2(N1,N2)*om0(N1,N2)));
                                VC3(N1,N2)=Ic3(N1,N2)*1/
(om0(N1,N2)*C3(N1,N2));
                                %admitancia total de secundario vista
desde primario
                                Y11(N1,N2)=1/Z11(N1,N2);
                                %rendimiento del sistema
                                Pcarga=PL(N1,N2);
                                P1(N1,N2)=real(V1*I1(N1,N2));
                                rend(N1,N2)=PL(N1,N2)/P1(N1,N2);

                                %
frecuencia=f0(N1,N2);
                                %factor de acoplamiento entre primario y
secundario
                                FA(N1,N2)=M(N1,N2)/sqrt(L1(
N1,N2)*L2(N1,N2));
                                ff(N1,N2)=ff(N1,N2)+0.1;
                                Qp(N1,N2)=L1(N1,N2)*RL/(
om0(N1,N2)*M(N1,N2)^2);
                                Qs(N1,N2)=om0(N1,N2)*L2(N1,N2)/RL;
                                if Qp(N1,N2)>Qs(N1,N2)
                                    fun(N1,N2)=(1/(1+abs((log(
Qp(N1,N2)/Qs(N1,N2))))))*(1/(1+abs(log(fmax/f0(N1,N2)))));
                                    relQ(N1,N2)=1;
                                else
                                    fun(N1,N2)=0*(1/(1+abs((log(
Qp(N1,N2)/Qs(N1,N2))))))*(1/(1+abs(log(fmax/f0(N1,N2)))));
                                    relQ(N1,N2)=0;
                                end

                            end
                             if PL(N1,N2)<Pdeseada & KC==1
                                if densiI1(N1,N2)>4
                                    seccion1(N1,N2)=seccion1(N1,N2)+0.1e-
6;
                                else
                                    seccion1(N1,N2)=seccion1(N1,N2)+1e-6;
                                end
                                if rend(N1,N2)<0.95
                                    ff(N1,N2)=ff(N1,N2)+1;
                                end
                            end
                            if densiI1(N1,N2)>densi1
                                if seccion1(N1,N2)<500e-6
                                    seccion1(N1,N2)=seccion1(N1,N2)+0.2e-
6;
                                else
```

```
                                    seccion1(N1,N2)=seccion1(N1,N2)+10e-
6;
                                end
                            end
                            if  densiI2(N1,N2)>densi2
                                seccion2(N1,N2)=seccion2(N1,N2)+0.2e-6;
                            end
                            if Argumentoredondeado(N1,N2)<-1
                                ff(N1,N2)=ff(N1,N2)+0.1;
                            end
                            if  densiI1(N1,N2)<=densi1 &&
densiI2(N1,N2)<=densi2
                                seccioncorrecta=1;
                            end
                        end
                        if seccioncorrecta==1 && ((KC~=1  &&
f0(N1,N2)>0.9*fmax && f0(N1,N2)<1.02*fmax && fun(N1,N2)>0)|| (KC==1 &&
f0(N1,N2)>0.9*fmax && f0(N1,N2)<1.02*fmax && PL(N1,N2)>=0.95*Pdeseada &&
PL(N1,N2)<1.05*Pdeseada && rend(N1,N2)>=rendimientodeseado &&
fun(N1,N2)>0 && densiI2(N1,N2)>=densi2*0.1 &&
densiI1(N1,N2)>=densi1*0.1))
                            f0(N1,N2)
                            salta=1
                            maxN1_optimo=N1
                            maxN2_optimo=N2
                            disp('soluci▯n optima')
                            opt=[N1 N2]
                            N1_optimo=N1;
                            s1_optima=seccion1(N1,N2)*1e6
                            N2_optimo=N2;
                            s2_optima=seccion2(N1,N2)*1e6
                            foptima=f0(N1,N2)
                            VC1_optima=abs(VC10(N1,N2))
                            VC2_optima=abs(VC20(N1,N2))
                            VC3_optima=abs(VC3(N1,N2))
                            VL3_optima=abs(VL3(N1,N2))
                            C1_optima=C1(N1,N2);
                            C2_optima=C2(N1,N2);
                            C3_optima=C3(N1,N2);
                            I1_optima=abs(I1(N1,N2));
                            I2_optima=abs(I2(N1,N2));
                            IC3_optima=abs(Ic3(N1,N2));
                            IC2_optima=abs(I2(N1,N2));
                            L3_optima=L3(N1,N2);
                            PL(N1,N2);
                            ff_optimo=ff(N1,N2);
                            rendimientoencontrado=1;
                            ya=1;
```

```
                            M_optima=M(N1,N2);
                            L1_optima=L1(N1,N2);
                            L2_optima=L2(N1,N2);
                            obj.Sol=true;
                        else
                            rendimientodeseado=rendimientodeseado-0.001;

                        end
                        if salta==0 && N1==maxN1 && N2==maxN2

                            disp('No hay soluci▯n')
                            obj.Sol=false;
                            %poner variable que indiqu que no hay sol
                            return

                        end
                    end

                end

            end
            if obj.Sol==true %solo me guarda las variables si se calculan
bien
                disp('programa terminado')
                obj.opt=opt;
                obj.f0=f0;
                obj.VC1=VC10;
                obj.VC2=VC20;
                obj.VC3=VC3;
                obj.VL3=VL3;
                obj.C1=C1;
                obj.C2=C2;
                obj.C3=C3;
                obj.S1=seccion1;
                obj.S2=seccion2;
                obj.I1=I1;
                obj.Ip=Ip;
                obj.I2=I2;
                obj.IC1=I1;
                obj.IC3=Ic3;
                obj.IL3=I1;
                obj.IC2=I2;
                obj.PL=PL;
                obj.rend=rend;
                obj.densiI1=densiI1;
                obj.densiI2=densiI2;
                obj.ff=ff;
                obj.fun=fun;
```

```
obj.Z2f;
obj.Z1f;
obj.ZL;
obj.densiI1;
obj.densiI2;
obj.densi1;
obj.densi2;
obj.L1=L1;
obj.L2=L2;
obj.L3=L3;
obj.Pcarga=Pcarga;
obj.P1=P1;
obj.FA=FA;
obj.Qp=Qp;
obj.Qs=Qs;
obj.M=M;
obj.k=k;
obj.R1=R1;
obj.R2=R2;
obj.RL=RL;
obj.densiI1=densiI1;
obj.densiI2=densiI2;

%Gr□ficas de las distintas variables

%radios equivalentes
ZL=RL; %ojo estamos despreciando parte imaginaria

r01=sqrt(N1_optimo*s1_optima/pi);
r02=sqrt(N2_optimo*s2_optima/pi);
cantcobre1=N1_optimo*2*(a1+b1)*s1_optima;
cantcobre2=N2_optimo*2*(a2+b2)*s2_optima;
cobretotal=cantcobre1+cantcobre2;
copper=cobretotal*1e6*8.96/1000;

dp1=sqrt(a1^2+b1^2);
dp2=sqrt(a2^2+b2^2);
%Factor de acoplamiento
k=M_optima/(sqrt(L1_optima*L2_optima));
%resistencias
R1_optima=5*(1/57)*N1_optimo*2*(b1+a1)/(s1_optima);
R2_optima=5*(1/57)*N2_optimo*2*(b2+a2)/(s2_optima);
%frecuencia de trabajo
%om0=(ff*sqrt(R1*(R2+RL)))/M;
%om0=(sqrt(R1*(R2+RL)))/M
om0=2*pi()*foptima;
T=1/foptima;
L1=4e-7*(N1_optimo^2)*(a1*log(2*a1*b1/
```

```
(r01*(a1+dp1)))+b1*log(2*a1*b1/(r01*(b1+dp1)))-2*(a1+b1-
dp1)+0.25*(a1+b1));
                L2=4e-7*(N2_optimo^2)*(a2*log(2*a2*b2/
(r02*(a2+dp2)))+b2*log(2*a2*b2/(r02*(b2+dp2)))-2*(a2+b2-
dp2)+0.25*(a2+b2));
                %inductancia mutua bobinas distintas
                %M tramos horizontales
                M1=N1_optimo*N2_optimo*1e-7*((a1-a2-c)*log(((a1-a2-
c)+sqrt(h^2+(e-b1)^2+(a1-a2-c)^2))/((a1-a2-c)+sqrt(h^2+e^2+(a1-a2-
c)^2)))+(a1-c)*log(((a1-c)+sqrt(h^2+e^2+(a1-c)^2))/((a1-c)+sqrt(h^2+(e-
b1)^2+(a1-c)^2))));
                M2=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(h^2+e^2+c^2))/((-c)+sqrt(h^2+c^2+(e-b1)^2))))+((a2+c)*log(((-a2-
c)+sqrt(h^2+(e-b1)^2+(a2+c)^2))/((-a2-c)+sqrt(h^2+(a2+c)^2+e^2)))));
                M3=N1_optimo*N2_optimo*1e-7*(sqrt(h^2+e^2+(a1-a2-c)^2)-
sqrt(h^2+e^2+(a1-c)^2)-
sqrt(h^2+e^2+(a2+c)^2)+sqrt(h^2+e^2+c^2)+sqrt(h^2+(e-b1)^2+(a1-c)^2)-
sqrt(h^2+(e-b1)^2+(a1-a2-c)^2)+sqrt(h^2+(e-b1)^2+(a2+c)^2)-sqrt(h^2+(e-
b1)^2+c^2));

                M11=N1_optimo*N2_optimo*1e-7*((a1-a2-c)*log(((a1-a2-
c)+sqrt(h^2+(e+b2-b1)^2+(a1-a2-c)^2))/((a1-a2-c)+sqrt(h^2+(b2+e)^2+(a1-
a2-c)^2)))+(a1-c)*log(((a1-c)+sqrt(h^2+(b2+e)^2+(a1-c)^2))/((a1-
c)+sqrt(h^2+(e+b2-b1)^2+(a1-c)^2))));
                M21=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(h^2+(b2+e)^2+c^2))/((-c)+sqrt(h^2+c^2+(e+b2-
b1)^2))))+((a2+c)*log(((-a2-c)+sqrt(h^2+(e+b2-b1)^2+(a2+c)^2))/((-a2-
c)+sqrt(h^2+(a2+c)^2+(b2+e)^2)))));
                M31=N1_optimo*N2_optimo*1e-7*(sqrt(h^2+(b2+e)^2+(a1-a2-
c)^2)-sqrt(h^2+(b2+e)^2+(a1-c)^2)-
sqrt(h^2+(b2+e)^2+(a2+c)^2)+sqrt(h^2+(b2+e)^2+c^2)+sqrt(h^2+(e+b2-
b1)^2+(a1-c)^2)-sqrt(h^2+(e+b2-b1)^2+(a1-a2-c)^2)+sqrt(h^2+(e+b2-
b1)^2+(a2+c)^2)-sqrt(h^2+(e+b2-b1)^2+c^2));

                Mh=(M1-M11+M2-M21+M3-M31);
                %M tramos verticales

                M4=N1_optimo*N2_optimo*1e-7*((b1-b2-e)*log(((b1-b2-
e)+sqrt(h^2+(c-a1)^2+(b1-b2-e)^2))/((b1-b2-e)+sqrt(h^2+c^2+(b1-b2-
e)^2)))+(b1-e)*log(((b1-e)+sqrt(h^2+c^2+(b1-e)^2))/((b1-e)+sqrt(h^2+(c-
a1)^2+(b1-e)^2))));
                M5=N1_optimo*N2_optimo*1e-7*((e*log(((-
e)+sqrt(h^2+c^2+e^2))/((-e)+sqrt(h^2+e^2+(c-a1)^2))))+((b2+e)*log(((-b2-
e)+sqrt(h^2+(c-a1)^2+(b2+e)^2))/((-b2-e)+sqrt(h^2+(b2+e)^2+c^2)))));
                M6=N1_optimo*N2_optimo*1e-7*(sqrt(h^2+c^2+(b1-b2-e)^2)-
sqrt(h^2+c^2+(b1-e)^2)-
sqrt(h^2+c^2+(b2+e)^2)+sqrt(h^2+c^2+e^2)+sqrt(h^2+(c-a1)^2+(b1-e)^2)-
```

```
sqrt(h^2+(c-a1)^2+(b1-b2-e)^2)+sqrt(h^2+(c-a1)^2+(b2+e)^2)-sqrt(h^2+(c-
a1)^2+e^2));

                M41=N1_optimo*N2_optimo*1e-7*((b1-b2-e)*log(((b1-b2-
e)+sqrt(h^2+(c+a2-a1)^2+(b1-b2-e)^2))/((b1-b2-e)+sqrt(h^2+(c+a2)^2+(b1-
b2-e)^2)))+(b1-e)*log(((b1-e)+sqrt(h^2+(c+a2)^2+(b1-e)^2))/((b1-
e)+sqrt(h^2+(c+a2-a1)^2+(b1-e)^2))));
                M51=N1_optimo*N2_optimo*1e-7*((e*log(((-
e)+sqrt(h^2+(c+a2)^2+e^2))/((-e)+sqrt(h^2+e^2+(c+a2-
a1)^2))))+((b2+e)*log(((-b2-e)+sqrt(h^2+(c+a2-a1)^2+(b2+e)^2))/((-b2-
e)+sqrt(h^2+(b2+e)^2+(c+a2)^2)))));
                M61=N1_optimo*N2_optimo*1e-7*(sqrt(h^2+(c+a2)^2+(b1-b2-
e)^2)-sqrt(h^2+(c+a2)^2+(b1-e)^2)-
sqrt(h^2+(c+a2)^2+(b2+e)^2)+sqrt(h^2+(c+a2)^2+e^2)+sqrt(h^2+(c+a2-
a1)^2+(b1-e)^2)-sqrt(h^2+(c+a2-a1)^2+(b1-b2-e)^2)+sqrt(h^2+(c+a2-
a1)^2+(b2+e)^2)-sqrt(h^2+(c+a2-a1)^2+e^2));
                Mv=(M4-M41+M5-M51+M6-M61);%Coeficiente de inducci◆n
mutua definitivo
                M=1*(Mh+Mv);

                M_optima=M;
                Z2f=R2_optima+j*(L2_optima*om0-1/(C2_optima*om0));
                Z1f=R1_optima+j*L1_optima*om0;

                %potencia en la carga
                KM_optima=(om0*M_optima)^2;
                Z11=Z1f+KM_optima/(Z2f+ZL);
                ZTPS=(Z11/(1+Z11*j*om0*C3_optima));
                imagZTPS=imag(ZTPS);
                ZT=(Z11/(1+Z11*j*om0*C3_optima)+1/(j*om0*C1_optima));
                Ztotal=ZT+j*L3_optima*om0;
                A2=-atan(imag(Ztotal)/real(Ztotal));
                A2grados=A2*360/(2*pi);
                A2redondeado=round(A2grados);
                I1=V1/Ztotal;
                modI1=abs(I1);
                Vp=V1-I1*(1/(j*om0*C1_optima))-I1*j*L3_optima*om0;


                Ic3=Vp*j*om0*C3_optima;
                modIc3=abs(Ic3);
                Ip=I1-Ic3;
                modIp=abs(Ip);
                I2=Ip*j*om0*M_optima/(Z2f+ZL);
                I2mod=abs(I2);
                VL2=I2*j*om0*L2_optima;
                PL=RL*(abs(I2)^2);
                P1=real(V1*I1);
```

```
%rendimiento
rend=PL/P1
VC1=abs(I1*(1/(j*C1_optima*om0)));
VC2=abs(I2*(1/(j*C2_optima*om0)));
VL=ZL*I2mod;

for p=1:180
    distancia(p)=(0.01+0.015*p)*h;
    relaciondistancia(p)=distancia(p)/h;

    M1_distancia(p)=N1_optimo*N2_optimo*1e-7*((a1-a2-
c)*log(((a1-a2-c)+sqrt(distancia(p)^2+(e-b1)^2+(a1-a2-c)^2))/((a1-a2-
c)+sqrt(distancia(p)^2+e^2+(a1-a2-c)^2)))+(a1-c)*log(((a1-
c)+sqrt(distancia(p)^2+e^2+(a1-c)^2))/((a1-c)+sqrt(distancia(p)^2+(e-
b1)^2+(a1-c)^2))));
    M2_distancia(p)=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(distancia(p)^2+e^2+c^2))/((-c)+sqrt(distancia(p)^2+c^2+(e-
b1)^2))))+((a2+c)*log(((-a2-c)+sqrt(distancia(p)^2+(e-
b1)^2+(a2+c)^2))/((-a2-c)+sqrt(distancia(p)^2+(a2+c)^2+e^2)))));
    M3_distancia(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(distancia(p)^2+e^2+(a1-a2-c)^2)-sqrt(distancia(p)^2+e^2+(a1-
c)^2)-
sqrt(distancia(p)^2+e^2+(a2+c)^2)+sqrt(distancia(p)^2+e^2+c^2)+sqrt(dista
ncia(p)^2+(e-b1)^2+(a1-c)^2)-sqrt(distancia(p)^2+(e-b1)^2+(a1-a2-
c)^2)+sqrt(distancia(p)^2+(e-b1)^2+(a2+c)^2)-sqrt(distancia(p)^2+(e-
b1)^2+c^2));

    M11_distancia(p)=N1_optimo*N2_optimo*1e-7*((a1-a2-
c)*log(((a1-a2-c)+sqrt(distancia(p)^2+(e+b2-b1)^2+(a1-a2-c)^2))/((a1-a2-
c)+sqrt(distancia(p)^2+(b2+e)^2+(a1-a2-c)^2)))+(a1-c)*log(((a1-
c)+sqrt(distancia(p)^2+(b2+e)^2+(a1-c)^2))/((a1-
c)+sqrt(distancia(p)^2+(e+b2-b1)^2+(a1-c)^2))));
    M21_distancia(p)=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(distancia(p)^2+(b2+e)^2+c^2))/((-
c)+sqrt(distancia(p)^2+c^2+(e+b2-b1)^2))))+((a2+c)*log(((-a2-
c)+sqrt(distancia(p)^2+(e+b2-b1)^2+(a2+c)^2))/((-a2-
c)+sqrt(distancia(p)^2+(a2+c)^2+(b2+e)^2)))));
    M31_distancia(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(distancia(p)^2+(b2+e)^2+(a1-a2-c)^2)-
sqrt(distancia(p)^2+(b2+e)^2+(a1-c)^2)-
sqrt(distancia(p)^2+(b2+e)^2+(a2+c)^2)+sqrt(distancia(p)^2+(b2+e)^2+c^2)+
sqrt(distancia(p)^2+(e+b2-b1)^2+(a1-c)^2)-sqrt(distancia(p)^2+(e+b2-
b1)^2+(a1-a2-c)^2)+sqrt(distancia(p)^2+(e+b2-b1)^2+(a2+c)^2)-
sqrt(distancia(p)^2+(e+b2-b1)^2+c^2));
```

```
                    Mh_distancia(p)=(M1_distancia(p)-
M11_distancia(p)+M2_distancia(p)-M21_distancia(p)+M3_distancia(p)-
M31_distancia(p));
                    %M tramos verticales

                    M4_distancia(p)=N1_optimo*N2_optimo*1e-7*((b1-b2-
e)*log(((b1-b2-e)+sqrt(distancia(p)^2+(c-a1)^2+(b1-b2-e)^2))/((b1-b2-
e)+sqrt(distancia(p)^2+c^2+(b1-b2-e)^2)))+(b1-e)*log(((b1-
e)+sqrt(distancia(p)^2+c^2+(b1-e)^2))/((b1-e)+sqrt(distancia(p)^2+(c-
a1)^2+(b1-e)^2))));
                    M5_distancia(p)=N1_optimo*N2_optimo*1e-7*((e*log(((-
e)+sqrt(distancia(p)^2+c^2+e^2))/((-e)+sqrt(distancia(p)^2+e^2+(c-
a1)^2))))+((b2+e)*log(((-b2-e)+sqrt(distancia(p)^2+(c-
a1)^2+(b2+e)^2))/((-b2-e)+sqrt(distancia(p)^2+(b2+e)^2+c^2)))));
                    M6_distancia(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(distancia(p)^2+c^2+(b1-b2-e)^2)-sqrt(distancia(p)^2+c^2+(b1-
e)^2)-
sqrt(distancia(p)^2+c^2+(b2+e)^2)+sqrt(distancia(p)^2+c^2+e^2)+sqrt(dista
ncia(p)^2+(c-a1)^2+(b1-e)^2)-sqrt(distancia(p)^2+(c-a1)^2+(b1-b2-
e)^2)+sqrt(distancia(p)^2+(c-a1)^2+(b2+e)^2)-sqrt(distancia(p)^2+(c-
a1)^2+e^2));

                    M41_distancia(p)=N1_optimo*N2_optimo*1e-7*((b1-b2-
e)*log(((b1-b2-e)+sqrt(distancia(p)^2+(c+a2-a1)^2+(b1-b2-e)^2))/((b1-b2-
e)+sqrt(distancia(p)^2+(c+a2)^2+(b1-b2-e)^2)))+(b1-e)*log(((b1-
e)+sqrt(distancia(p)^2+(c+a2)^2+(b1-e)^2))/((b1-
e)+sqrt(distancia(p)^2+(c+a2-a1)^2+(b1-e)^2))));
                    M51_distancia(p)=N1_optimo*N2_optimo*1e-7*((e*log(((-
e)+sqrt(distancia(p)^2+(c+a2)^2+e^2))/((-
e)+sqrt(distancia(p)^2+e^2+(c+a2-a1)^2))))+((b2+e)*log(((-b2-
e)+sqrt(distancia(p)^2+(c+a2-a1)^2+(b2+e)^2))/((-b2-
e)+sqrt(distancia(p)^2+(b2+e)^2+(c+a2)^2)))));
                    M61_distancia(p)=N1_optimo*N2_optimo(1)*1e-
7*(sqrt(distancia(p)^2+(c+a2)^2+(b1-b2-e)^2)-
sqrt(distancia(p)^2+(c+a2)^2+(b1-e)^2)-
sqrt(distancia(p)^2+(c+a2)^2+(b2+e)^2)+sqrt(distancia(p)^2+(c+a2)^2+e^2)+
sqrt(distancia(p)^2+(c+a2-a1)^2+(b1-e)^2)-sqrt(distancia(p)^2+(c+a2-
a1)^2+(b1-b2-e)^2)+sqrt(distancia(p)^2+(c+a2-a1)^2+(b2+e)^2)-
sqrt(distancia(p)^2+(c+a2-a1)^2+e^2));
                    Mv_distancia(p)=(M4_distancia(p)-
M41_distancia(p)+M5_distancia(p)-M51_distancia(p)+M6_distancia(p)-
M61_distancia(p));%Coeficiente de inducci□n mutua definitivo
                    M_distancia(p)=(Mh_distancia(p)+Mv_distancia(p));

                    %Factor de acoplamiento
                    k_distancia(p)=M_distancia(p)/
(sqrt(L1_optima*L2_optima));
```

```
                    Z2f_distancia(p)=R2_optima+j*(L2_optima*om0-
1/(C2_optima*om0));
                    Z1f_distancia(p)=R1_optima+j*(L1_optima*om0);

                    %potencia en la carga
                    KM_distancia(p)=(om0*M_distancia(p))^2;
                    Z11_distancia(p)=Z1f_distancia(p)+KM_distancia(p)/
(Z2f_distancia(p)+RL);
                    ZT_distancia(p)=(Z11_distancia(p)/
(1+Z11_distancia(p)*j*om0*C3_optima))+1/(j*om0*C1_optima);

                    Ztotal_distancia(p)=ZT_distancia(p)+j*L3_optima*om0;
                    Argumento_distancia(p)=-
atan(imag(Ztotal_distancia(p))/real(Ztotal_distancia(p)));

Argumentogrados_distancia(p)=Argumento_distancia(p)*360/(2*pi);

Argumentoredondeado_distancia(p)=round(Argumentogrados_distancia(p));

                    I1_distancia(p)=V1/Ztotal_distancia(p);
                    modI1_distancia(p)=abs(I1_distancia(p));
                    Vp_distancia(p)=V1-
I1_distancia(p)*(1/(j*om0*C1_optima))-I1_distancia(p)*j*L3_optima*om0;
                    Ic3_distancia(p)=Vp_distancia(p)*j*om0*C3_optima;
                    modIc3_distancia(p)=abs(Ic3_distancia(p));
                    Ip_distancia(p)=I1_distancia(p)-Ic3_distancia(p);
                    modIp_distancia(p)=abs(Ip_distancia(p));
                    I2_distancia(p)=Ip_distancia(p)*j*om0*M_distancia(p)/
(Z2f_distancia(p)+ZL);
                    modI2_distancia(p)=abs(I2_distancia(p));

                    PL_distancia(p)=RL*(modI2_distancia(p)^2);
                    P1_distancia(p)=real(V1*I1_distancia(p));
                    rend_distancia(p)=PL_distancia(p)/P1_distancia(p);
                    %rendimiento


VC1_distancia(p)=abs(I1_distancia(p)*(1/(j*C1_optima)));

VC2_distancia(p)=abs(I2_distancia(p)*(1/(j*C2_optima)));
                    VL_distancia(p)=RL*modI2_distancia(p);


                end
                %Carga de las variables a graficas en el objeto
                obj.distancia=distancia;
                obj.modI1_distancia=modI1_distancia;
```

```
obj.Argumentoredondeado_distancia=Argumentogrados_distancia;
                obj.VL_distancia=VL_distancia;
                obj.modI2_distancia=modI2_distancia;
                obj.PL_distancia=PL_distancia;
                obj.P1_distancia=P1_distancia;
                obj.rend_distancia=rend_distancia;
                obj.modIp_distancia=modIp_distancia;
                obj.modIc3_distancia=modIc3_distancia;
                obj.VC1_distancia=VC1_distancia;
                obj.VC2_distancia=VC2_distancia;


                for p=1:100
                    omega(p)=(0.95+0.001*p)*om0;
                    f(p)=omega(p)/(2*pi);
                    relacionfrecuencia(p)=omega(p)/om0;
                    %Z2f=R2+j*L2*om0+(1/(C2*j*om0+(1/ZL)))
                    %Z2f=1/(1/(R2+j*L2*om0)+(C2*j*om0)+(1/ZL))
                    Z2f_freq(p)=R2_optima+j*(L2_optima*omega(p)-
1/(C2_optima*omega(p)));
                    Z1f_freq(p)=R1_optima+j*(L1_optima*omega(p));

                    %potencia en la carga
                    KM_freq(p)=(omega(p)*M_optima)^2;
                    Z11_freq(p)=Z1f_freq(p)+KM_freq(p)/(Z2f_freq(p)+ZL);
                    ZT_freq(p)=(Z11_freq(p)/(1+Z11_freq(p)
*j*omega(p)*C3_optima))+1/(j*omega(p)*C1_optima);
                    Ztotal_freq(p)=ZT_freq(p)+j*L3_optima*omega(p);

                    A2_freq(p)=-
atan(imag(Ztotal_freq(p))/real(Ztotal_freq(p)));
                    A2grados_freq(p)=A2_freq(p)*360/(2*pi);
                    A2redondeado_freq(p)=round(A2grados_freq(p));

                    I1_freq(p)=V1/Ztotal_freq(p);
                    modI1_freq(p)=abs(I1_freq(p));
                    Vp_freq(p)=V1-I1_freq(p)*(1/(j*omega(p)*C1_optima))-
I1_freq(p)*j*L3_optima*omega(p);
                    Ic3_freq(p)=Vp_freq(p)*j*omega(p)*C3_optima;
                    modIc3_freq(p)=abs(Ic3_freq(p));
                    Ip_freq(p)=I1_freq(p)-Ic3_freq(p);
                    modIp_freq(p)=abs(Ip_freq(p));

I2_freq(p)=Ip_freq(p)*j*omega(p)*M_optima/(Z2f_freq(p)+ZL);
                    modI2_freq(p)=abs(I2_freq(p));

                    PL_freq(p)=RL*(modI2_freq(p)^2);
```

```
                    P1_freq(p)=real(V1*I1_freq(p));
                    rend_freq(p)=PL_freq(p)/P1_freq(p);
                    %rendimiento

                    VC1_freq(p)=abs(I1_freq(p)*(1/
(j*C1_optima*omega(p))));
                    VC2_freq(p)=abs(I2_freq(p)*(1/
(j*C2_optima*omega(p))));
                    VL_freq(p)=abs(ZL*modI2_freq(p));

                end
                %Carga de las variables a graficas en el objeto
                obj.f=f;
                obj.modI1_freq=modI1_freq;
                obj.A2rgumentoredondeado_freq=A2grados_freq;%quitado
redondeo
                obj.VL_freq =  VL_freq ;
                obj.modI2_freq=modI2_freq;
                obj.PL_freq=PL_freq;
                obj.P1_freq= P1_freq;
                obj.rend_freq=rend_freq;
                obj.modIp_freq= modIp_freq;
                obj.modIc3_freq=modIc3_freq;
                obj.VC1_freq=VC1_freq;
                obj.VC2_freq=VC2_freq;
                %Carga de las variables a graficas en el objeto


                avance= round(112/b2);
                for p=1:avance
                    posy(p)=(-90*b2/100)+(1*b2/100)*p;%posiciones en cada
iteracion el numero de puntos
                    posyrelativa(p)=(posy(p)-e)*100/b2;

                    M1_pos(p)=N1_optimo*N2_optimo*1e-7*((a1-a2-
c)*log(((a1-a2-c)+sqrt(h^2+(posy(p)-b1)^2+(a1-a2-c)^2))/((a1-a2-
c)+sqrt(h^2+posy(p)^2+(a1-a2-c)^2)))+(a1-c)*log(((a1-
c)+sqrt(h^2+posy(p)^2+(a1-c)^2))/((a1-c)+sqrt(h^2+(posy(p)-b1)^2+(a1-
c)^2))));
                    M2_pos(p)=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(h^2+posy(p)^2+c^2))/((-c)+sqrt(h^2+c^2+(posy(p)-
b1)^2))))+((a2+c)*log(((-a2-c)+sqrt(h^2+(posy(p)-b1)^2+(a2+c)^2))/((-a2-
c)+sqrt(h^2+(a2+c)^2+posy(p)^2)))));
                    M3_pos(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(h^2+posy(p)^2+(a1-a2-c)^2)-sqrt(h^2+posy(p)^2+(a1-c)^2)-
sqrt(h^2+posy(p)^2+(a2+c)^2)+sqrt(h^2+posy(p)^2+c^2)+sqrt(h^2+(posy(p)-
b1)^2+(a1-c)^2)-sqrt(h^2+(posy(p)-b1)^2+(a1-a2-c)^2)+sqrt(h^2+(posy(p)-
b1)^2+(a2+c)^2)-sqrt(h^2+(posy(p)-b1)^2+c^2));
```

```
                    M11_pos(p)=N1_optimo*N2_optimo*1e-7*((a1-a2-
c)*log(((a1-a2-c)+sqrt(h^2+(posy(p)+b2-b1)^2+(a1-a2-c)^2))/((a1-a2-
c)+sqrt(h^2+(b2+posy(p))^2+(a1-a2-c)^2)))+(a1-c)*log(((a1-
c)+sqrt(h^2+(b2+posy(p))^2+(a1-c)^2))/((a1-c)+sqrt(h^2+(posy(p)+b2-
b1)^2+(a1-c)^2))));
                    M21_pos(p)=N1_optimo*N2_optimo*1e-7*((c*log(((-
c)+sqrt(h^2+(b2+posy(p))^2+c^2))/((-c)+sqrt(h^2+c^2+(posy(p)+b2-
b1)^2))))+((a2+c)*log(((-a2-c)+sqrt(h^2+(posy(p)+b2-b1)^2+(a2+c)^2))/((-
a2-c)+sqrt(h^2+(a2+c)^2+(b2+posy(p))^2)))));
                    M31_pos(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(h^2+(b2+posy(p))^2+(a1-a2-c)^2)-sqrt(h^2+(b2+posy(p))^2+(a1-
c)^2)-
sqrt(h^2+(b2+posy(p))^2+(a2+c)^2)+sqrt(h^2+(b2+posy(p))^2+c^2)+sqrt(h^2+(
posy(p)+b2-b1)^2+(a1-c)^2)-sqrt(h^2+(posy(p)+b2-b1)^2+(a1-a2-
c)^2)+sqrt(h^2+(posy(p)+b2-b1)^2+(a2+c)^2)-sqrt(h^2+(posy(p)+b2-
b1)^2+c^2));


                    Mh_pos(p)=(M1_pos(p)-M11_pos(p)+M2_pos(p)-
M21_pos(p)+M3_pos(p)-M31_pos(p));
                    %M tramos verticales

                    M4_pos(p)=N1_optimo*N2_optimo*1e-7*((b1-b2-
posy(p))*log(((b1-b2-posy(p))+sqrt(h^2+(c-a1)^2+(b1-b2-posy(p))^2))/((b1-
b2-posy(p))+sqrt(h^2+c^2+(b1-b2-posy(p))^2)))+(b1-posy(p))*log(((b1-
posy(p))+sqrt(h^2+c^2+(b1-posy(p))^2))/((b1-posy(p))+sqrt(h^2+(c-
a1)^2+(b1-posy(p))^2))));
                    M5_pos(p)=N1_optimo*N2_optimo*1e-7*((posy(p)*log(((-
posy(p))+sqrt(h^2+c^2+posy(p)^2))/((-posy(p))+sqrt(h^2+posy(p)^2+(c-
a1)^2))))+((b2+posy(p))*log(((-b2-posy(p))+sqrt(h^2+(c-
a1)^2+(b2+posy(p))^2))/((-b2-posy(p))+sqrt(h^2+(b2+posy(p))^2+c^2)))));
                    M6_pos(p)=N1_optimo*N2_optimo*1e-7*(sqrt(h^2+c^2+(b1-
b2-posy(p))^2)-sqrt(h^2+c^2+(b1-posy(p))^2)-
sqrt(h^2+c^2+(b2+posy(p))^2)+sqrt(h^2+c^2+posy(p)^2)+sqrt(h^2+(c-
a1)^2+(b1-posy(p))^2)-sqrt(h^2+(c-a1)^2+(b1-b2-posy(p))^2)+sqrt(h^2+(c-
a1)^2+(b2+posy(p))^2)-sqrt(h^2+(c-a1)^2+posy(p)^2));

                    M41_pos(p)=N1_optimo*N2_optimo*1e-7*((b1-b2-
posy(p))*log(((b1-b2-posy(p))+sqrt(h^2+(c+a2-a1)^2+(b1-b2-
posy(p))^2))/((b1-b2-posy(p))+sqrt(h^2+(c+a2)^2+(b1-b2-posy(p))^2)))+(b1-
posy(p))*log(((b1-posy(p))+sqrt(h^2+(c+a2)^2+(b1-posy(p))^2))/((b1-
posy(p))+sqrt(h^2+(c+a2-a1)^2+(b1-posy(p))^2))));
                    M51_pos(p)=N1_optimo*N2_optimo*1e-7*((posy(p)*log(((-
posy(p))+sqrt(h^2+(c+a2)^2+posy(p)^2))/((-
posy(p))+sqrt(h^2+posy(p)^2+(c+a2-a1)^2))))+((b2+posy(p))*log(((-b2-
posy(p))+sqrt(h^2+(c+a2-a1)^2+(b2+posy(p))^2))/((-b2-
posy(p))+sqrt(h^2+(b2+posy(p))^2+(c+a2)^2)))));
```

```
                    M61_pos(p)=N1_optimo*N2_optimo*1e-
7*(sqrt(h^2+(c+a2)^2+(b1-b2-posy(p))^2)-sqrt(h^2+(c+a2)^2+(b1-
posy(p))^2)-
sqrt(h^2+(c+a2)^2+(b2+posy(p))^2)+sqrt(h^2+(c+a2)^2+posy(p)^2)+sqrt(h^2+(
c+a2-a1)^2+(b1-posy(p))^2)-sqrt(h^2+(c+a2-a1)^2+(b1-b2-
posy(p))^2)+sqrt(h^2+(c+a2-a1)^2+(b2+posy(p))^2)-sqrt(h^2+(c+a2-
a1)^2+posy(p)^2));
                    Mv_pos(p)=(M4_pos(p)-M41_pos(p)+M5_pos(p)-
M51_pos(p)+M6_pos(p)-M61_pos(p));
                    %Coeficiente de inducci□n mutua definitivo
                    M_pos(p)=1*(Mh_pos(p)+Mv_pos(p));


                    %Factor de acoplamiento
                    k_pos(p)=M_pos(p)/(sqrt(L1_optima*L2_optima));
                    Z2f_pos(p)=R2_optima+j*(L2_optima*om0-
1/(C2_optima*om0));
                    Z1f_pos(p)=R1_optima+j*(L1_optima*om0);
                    V(p)=V1;
                    %potencia en la carga
                    KM_pos(p)=(om0*M_pos(p))^2;
                    Z11_pos(p)=Z1f_pos(p)+KM_pos(p)/(Z2f_pos(p)+RL);

ZT_pos(p)=(Z11_pos(p)/(1+Z11_pos(p)*j*om0*C3_optima))+1/(j*om0*C1_optima)
;


                    Ztotal_pos(p)=ZT_pos(p)+j*L3_optima*om0;

                    A2_pos(p)=-
atan(imag(Ztotal_pos(p))/real(Ztotal_pos(p)));
                    A2grados_pos(p)=A2_pos(p)*360/(2*pi);
                    A2redondeado_pos(p)=round(A2grados_pos(p));

                    I1_pos(p)=V1/Ztotal_pos(p);
                    modI1_pos(p)=abs(I1_pos(p));
                    Vp_pos(p)=V1-I1_pos(p)*(1/(j*om0*C1_optima))-
I1_pos(p)*j*L3_optima*om0;
                    modVp_pos(p)=abs(Vp_pos(p));
                    IC3_pos(p)=Vp_pos(p)*j*om0*C3_optima;
                    modIC3_pos(p)=abs(IC3_pos(p));
                    Ip_pos(p)=I1_pos(p)-IC3_pos(p);
                    modIp_pos(p)=abs(Ip_pos(p));
                    I2_pos(p)=Ip_pos(p)*j*om0*M_pos(p)/(Z2f_pos(p)+ZL);
                    modI2_pos(p)=abs(I2_pos(p));

                    PL_pos(p)=RL*(modI2_pos(p)^2);
                    P1_pos(p)=real(V1*I1_pos(p));
                    rend_pos(p)=PL_pos(p)/P1_pos(p);
```

```
                    %rendimiento

                    VC1_pos(p)=abs(I1_pos(p)*(1/(j*C1_optima*om0)));
                    VC2_pos(p)=abs(I2_pos(p)*(1/(j*C2_optima*om0)));
                    VL_pos(p)=RL*modI2_pos(p);
                end

                %Carga de las variables a graficas en el objeto
                obj.posyrelativa=posyrelativa;
                obj.modI1_pos=modI1_pos;
                obj.A2rgumentoredondeado_pos=A2grados_pos;
                obj.VL_pos    =    VL_pos    ;
                obj.modI2_pos=modI2_pos;
                obj.PL_pos=PL_pos;
                obj.P1_pos=P1_pos;
                obj.rend_pos=rend_pos;
                obj.modIp_pos= modIp_pos;
                obj.modIc3_pos=modIC3_pos;
                obj.VC1_pos=VC1_pos;
                obj.VC2_pos=VC2_pos;



                for p=1:500
                    carga(p)=0.01*p*RL;
                    variacioncarga(p)=abs(carga(p))/abs(ZL);

%Z2f=R2_optima+j*L2_optima*om0+(1/(C2_optima*j*om0+(1/ZL)))

%Z2f=1/(1/(R2_optima+j*L2_optima*om0)+(C2_optima*j*om0)+(1/ZL))
                    Z2f_carga(p)=R2_optima+j*(L2_optima*om0-
1/(C2_optima*om0));
                    Z1f_carga(p)=R1_optima+j*(L1_optima*om0);

                    %potencia en la carga
                    KM_carga(p)=(om0*M_optima)^2;

Z11_carga(p)=Z1f_carga(p)+KM_carga(p)/(Z2f_carga(p)+carga(p));

ZT_carga(p)=(Z11_carga(p)/(1+Z11_carga(p)*j*om0*C3_optima))+1/(j*om0*C1_o
ptima);
                    Ztotal_carga(p)=ZT_carga(p)+j*L3_optima*om0;

                    A2_carga(p)=-
atan(imag(Ztotal_carga(p))/real(Ztotal_carga(p)));
                    A2grados_carga(p)=A2_carga(p)*360/(2*pi);
                    A2redondeado_carga(p)=round(A2grados_carga(p));
```

```
                    I1_carga(p)=V1/Ztotal_carga(p);
                    modI1_carga(p)=abs(I1_carga(p));
                    Vp_carga(p)=V1-I1_carga(p)*(1/(j*om0*C1_optima))-
I1_carga(p)*j*L3_optima*om0;
                    modVp_carga(p)= abs(Vp_carga(p));
                    IC3_carga(p)=Vp_carga(p)*j*om0*C3_optima;
                    modIC3_carga(p)=abs(IC3_carga(p));
                    Ip_carga(p)=I1_carga(p)-IC3_carga(p);
                    modIp_carga(p)=abs(Ip_carga(p));
                    I2_carga(p)=Ip_carga(p)*j*om0*M_optima/
(Z2f_carga(p)+carga(p));
                    modI2_carga(p)=abs(I2_carga(p));

                    PL_carga(p)=carga(p)*(modI2_carga(p)^2);
                    P1_carga(p)=real(V1*I1_carga(p));
                    rend_carga(p)=PL_carga(p)/P1_carga(p);
                    %rendimiento

                    VC1_carga=abs(I1_carga(p)*(1/(j*C1_optima*om0)));
                    VC2_carga=abs(I2_carga(p)*(1/(j*C2_optima*om0)));
                    VL_carga(p)=abs(carga(p)*modI2_carga(p));
                end
                %Carga de las variables a graficas en el objeto

                obj.variacioncarga=variacioncarga;
                obj.modI1_carga=modI1_carga;
                obj.A2rgumentoredondeado_carga=A2grados_carga;%quitado el
redondeo
                obj.VL_carga =    VL_carga ;
                obj.modI2_carga=modI2_carga;
                obj.PL_carga=PL_carga;
                obj.P1_carga=P1_carga;
                obj.rend_carga=rend_carga;
                obj.modIp_carga=modIp_carga;
                obj.modIc3_carga=modIC3_carga;
                obj.VC1_carga=VC1_carga;
                obj.VC2_carga=VC2_carga;
            end

        end

        function  obj =
CoGcir(obj,app,Vcc,Vbat,h,r1,r2,fmax,densi1,densi2,maxN1,maxN2,Pdeseada,V
deseada,KC)
            %CoGcir calculara los parametros de dise□o para bobinas
            %circulares.
            obj.Gtype='cir';
            obj.r1=r1;
```

```
            obj.r2=r2;
            obj.Vcc=Vcc;
            V1=2*sqrt(2)*Vcc/pi();
            obj.Vbat=Vbat;
            obj.V1=V1;
            obj.densi1=densi1;
            obj.densi2=densi2;
            obj.KC=KC;
            if KC==0
                KC1=1;
            elseif KC==1
                KC1=1e15;
            else
                KC1=0.25;
            end
            obj.KC1=KC1;
            %parametros geom�tricos
            if obj.KC==0

                obj.Comtype='SS';
            end
            if obj.KC==1
                obj.Comtype='PS';

            end
            if obj.KC~=1 && obj.KC~=0
                obj.Comtype='SPS';
            end
            obj.h=h;
            %secciones y n�mero de espiras
            obj.maxN1=maxN1;
            obj.maxN2=maxN2;
            obj.fmax=fmax;
            obj.Pdeseada= Pdeseada;
            obj.Vdeseada=Vdeseada;
            RL=Vdeseada^2/Pdeseada;
            obj.RL=RL;

            %c�lculo para las distintas combinaciones de espiras
geometria cuadrada
            %Inicializaci�n de variables con la intencion de aumentar la
            %velociadad
            seccion1=zeros(maxN1,maxN2);
            seccion2=zeros(maxN1,maxN2);
            %             cantcobre1=zeros(maxN1,maxN2);
            %             cantcobre2=zeros(maxN1,maxN2);
            %             cobretotal=zeros(maxN1,maxN2);
            r01=zeros(maxN1,maxN2);
```

```
r02=zeros(maxN1,maxN2);
L1=zeros(maxN1,maxN2);
L2=zeros(maxN1,maxN2);
M1=zeros(maxN1,maxN2);
M2=zeros(maxN1,maxN2);
M3=zeros(maxN1,maxN2);
M11=zeros(maxN1,maxN2);
M21=zeros(maxN1,maxN2);
M31=zeros(maxN1,maxN2);
Mh=zeros(maxN1,maxN2);
M4=zeros(maxN1,maxN2);
M5=zeros(maxN1,maxN2);
M6=zeros(maxN1,maxN2);
M41=zeros(maxN1,maxN2);
M51=zeros(maxN1,maxN2);
M61=zeros(maxN1,maxN2);
Mv=zeros(maxN1,maxN2);
M=zeros(maxN1,maxN2);
k=zeros(maxN1,maxN2);
R1=zeros(maxN1,maxN2);
R2=zeros(maxN1,maxN2);
% RL=zeros(maxN1,maxN2);
ff=zeros(maxN1,maxN2);
om0=zeros(maxN1,maxN2);
f0=zeros(maxN1,maxN2);
C2=zeros(maxN1,maxN2);
C3=zeros(maxN1,maxN2);
Z2f=zeros(maxN1,maxN2);
Z1f=zeros(maxN1,maxN2);
ZL=zeros(maxN1,maxN2);
KM=zeros(maxN1,maxN2);
Z11=zeros(maxN1,maxN2);
ZTPS=zeros(maxN1,maxN2);
imagZTPS=zeros(maxN1,maxN2);
C1=zeros(maxN1,maxN2);
ZT=zeros(maxN1,maxN2);
%             A2=zeros(maxN1,maxN2);
%             A2grados=zeros(maxN1,maxN2);
%             A2redondeado=zeros(maxN1,maxN2);
I1=zeros(maxN1,maxN2);
Vp=zeros(maxN1,maxN2);
Ic3=zeros(maxN1,maxN2);
Ip=zeros(maxN1,maxN2);
I2=zeros(maxN1,maxN2);
densiI1=zeros(maxN1,maxN2);
densiI2=zeros(maxN1,maxN2);
PL=zeros(maxN1,maxN2);
VL=zeros(maxN1,maxN2);
```

```
VC10=zeros(maxN1,maxN2);
VC20=zeros(maxN1,maxN2);
Y11=zeros(maxN1,maxN2);
P1=zeros(maxN1,maxN2);
rend=zeros(maxN1,maxN2);
FA=zeros(maxN1,maxN2);
Qp=zeros(maxN1,maxN2);
Qs=zeros(maxN1,maxN2);
fun=zeros(maxN1,maxN2);
relQ=zeros(maxN1,maxN2);
VL3=zeros(maxN1,maxN2);
imagZT=zeros(maxN1,maxN2);
VC3=zeros(maxN1,maxN2);
Ztotal=zeros(maxN1,maxN2);
% L3=zeros(maxN1,maxN2);%solo esta da problemas
Argumentogrados=zeros(maxN1,maxN2);
Argumentoredondeado=zeros(maxN1,maxN2);

ya=0;
salta=0;
rendimientodeseado=1;
while ya<1
    for N1=1:maxN1
        if salta<1
            app.N1EditField.Value=N1;
        end

        for N2=1:maxN2

            if Pdeseada< 750
                seccion1(N1,N2)=0.1e-6;
                seccion2(N1,N2)=0.1e-6;

            else
                seccion1(N1,N2)=1e-6;
                seccion2(N1,N2)=1e-6;
            end
            seccioncorrecta=0;


            if salta<1
                app.N2EditField.Value=N2;
            end

            while seccioncorrecta<1 & salta<1
                if app.stop
                    app.N1EditField.Value=N1;
                    app.N2EditField.Value=N2;
```

```
                            disp('interrumpido')
                            return
                        end
                        pause(0.0000001)%necesario para que app.stop
actualice

                        % A=[N1 N2]
                        %seccion1(N1,N2);
                        %seccion2(N1,N2);


                        %radios equivalentes de primario y secundario
                        d1(N1,N2)=2*sqrt(N1*seccion1(N1,N2)/(pi));
                        d2(N1,N2)=2*sqrt(N2*seccion2(N1,N2)/(pi));

                        L1(N1,N2)=1*4*pi*1e-
7*N1^2*r1*(log(16*r1/d1(N1,N2))-2);
                        L2(N1,N2)=1*4*pi*1e-
7*N2^2*r2*(log(16*r2/d2(N1,N2))-2);


                        %inductancia mutua bobinas distintas
                        %M tramos horizontales
                        m=4*r1*r2/((r1+r2)^2+h^2);
                        [K,E]=ellipke(m);
                        M(N1,N2)=0.5*4*pi*1e-
7*N1*N2*sqrt((r1+r2)^2+h^2)*((2-m)*K-2*E);

                        %factor de acoplamiento
                        k(N1,N2)=M(N1,N2)/
(sqrt(L1(N1,N2)*L2(N1,N2)));
                        %resistencias
                        R1(N1,N2)=(1/57)*N1*2*pi()*r1/
(seccion1(N1,N2));
                        R2(N1,N2)=(1/57)*N2*2*pi()*r2/
(seccion2(N1,N2));

                        %inicializaci□n de variables
                        ff(N1,N2)=1;
                        Pcarga=10000;
                        frecuencia=1000;
                        while  Pcarga>Pdeseada
                            %frecuencia de tragajo
                            om0(N1,N2)=(ff(N1,N2)*sqrt(R1(N1,
N2)*(R2(N1,N2)+RL)))/M(N1,N2);
                            f0(N1,N2)=om0(N1,N2)/(2*pi);
                            %condensadores de acoplo
                            C2(N1,N2)=1/((L2(N1,N2))*(om0(N1,N2)^2));
```

```
                                C3(N1,N2)=KC*(L2(N1,N2)*C2(N1,N2))/
(L1(N1,N2)+(M(N1,N2)^4/(L1(N1,N2)*L2(N1,N2)*C2(N1,N2)*RL^2)));
                                Z2f(N1,N2)=R2(N1,N2)+j*(L2(N1,N2)*om0(
N1,N2)-1/(C2(N1,N2)*om0(N1,N2)));
                                Z1f(N1,N2)=R1(N1,N2)+j*L1(
N1,N2)*om0(N1,N2);
                                ZL=RL;
                                %c◆lculo de la potencia en la carga
                                KM(N1,N2)=(om0(N1,N2)*M(N1,N2))^2;
                                %impedancia total de secundario vista
desde el primario
                                Z11(N1,N2)=Z1f(N1,N2)+KM(N1,N2)/
(Z2f(N1,N2)+ZL);
                                ZTPS(N1,N2)=(Z11(N1,N2)/
(1+Z11(N1,N2)*j*om0(N1,N2)*C3(N1,N2)));
                                imagZTPS(N1,N2)=imag(ZTPS(N1,N2));
                                C1(N1,N2)=KC1*1/
(imagZTPS(N1,N2)*om0(N1,N2));
                                ZT(N1,N2)=(Z11(N1,N2)/
(1+Z11(N1,N2)*j*om0(N1,N2)*C3(N1,N2))+1/(j*om0(N1,N2)*C1(N1,N2)));

                                imagZT(N1,N2)=imag(ZT(N1,N2));
                                L3(N1,N2)=-imagZT(N1,N2)/om0(N1,N2);
                                Ztotal(N1,N2)=ZT(N1,N2)+j*om0(
N1,N2)*L3(N1*N2);
                                %intensaidades de primario y secundario
                                Argumento(N1,N2)=-
atan(imag(Ztotal(N1,N2))/real(Ztotal(N1,N2)));

Argumentogrados(N1,N2)=Argumento(N1,N2)*360/(2*pi);
                                Argumentoredondeado(N1,N2)=round(
Argumentogrados(N1,N2));

                                I1(N1,N2)=V1/Ztotal(N1,N2);
                                Vp(N1,N2)=V1-
I1(N1,N2)*(1/(j*om0(N1,N2)*C1(N1,N2)))-I1(N1,N2)*j*L3(N1,N2)*om0(N1,N2);
                                Ic3(N1,N2)=Vp(N1,N2)*j*om0(
N1,N2)*C3(N1,N2);
                                VL3(N1,N2)=j*om0(N1,N2)*L3(
N1,N2)*I1(N1,N2);
                                Ip(N1,N2)=I1(N1,N2)-Ic3(N1,N2);
                                I2(N1,N2)=Ip(N1,N2)*j*om0(N1,N2)*M(
N1,N2)/(Z2f(N1,N2)+ZL);

                                densiI1(N1,N2)=(abs(Ip(N1,N2))/
seccion1(N1,N2))*1e-6;
                                densiI2(N1,N2)=(abs(I2(N1,N2))/
seccion2(N1,N2))*1e-6;
```

```
                                %potencia en la carga
                                PL(N1,N2)=RL*(abs(I2(N1,N2))^2);
                                VL(N1,N2)=I2(N1,N2)*ZL;
                                % tensi□n en los condensadores de acoplo
de primario y secundario
                                VC10(N1,N2)=I1(N1,N2)*(
1/(j*C1(N1,N2)*om0(N1,N2)));
                                VC20(N1,N2)=I2(N1,N2)*(
1/(j*C2(N1,N2)*om0(N1,N2)));
                                %admitancia total de secundario vista
desde primario
                                Y11(N1,N2)=1/Z11(N1,N2);
                                %rendimiento del sistema
                                Pcarga=PL(N1,N2);
                                P1(N1,N2)=real(V1*I1(N1,N2));
                                rend(N1,N2)=PL(N1,N2)/P1(N1,N2);

                                frecuencia=f0(N1,N2);
                                %factor de acoplamiento entre primario y
secundario
                                FA(N1,N2)=M(N1,N2)/
sqrt(L1(N1,N2)*L2(N1,N2));
                                ff(N1,N2)=ff(N1,N2)+0.1;
                                Qp(N1,N2)=L1(N1,N2)*RL/
(om0(N1,N2)*M(N1,N2)^2);
                                Qs(N1,N2)=om0(N1,N2)*L2(N1,N2)/RL;
                                if Qp(N1,N2)>Qs(N1,N2)
                                    fun(N1,N2)=(1/(1+abs((log(Qp(N1,N2)/
Qs(N1,N2))))))*(1/(1+abs(log(fmax/f0(N1,N2)))));
                                    relQ(N1,N2)=1;
                                else
                                    fun(N1,N2)=0*(1/(1+abs((log(Qp(
N1,N2)/Qs(N1,N2))))))*(1/(1+abs(log(fmax/f0(N1,N2)))));
                                    relQ(N1,N2)=0;
                                end

                            end
                            if PL(N1,N2)<Pdeseada & KC==1
                                if densiI1(N1,N2)>4
                                    seccion1(N1,N2)=seccion1(N1,N2)+0.1e-
6;
                                else
                                    seccion1(N1,N2)=seccion1(N1,N2)+1e-6;
                                end
                                if rend(N1,N2)<0.95
                                    ff(N1,N2)=ff(N1,N2)+1;
```

```
                            end
                        end

                        if densiI1(N1,N2)>densi1
                            if seccion1(N1,N2)<500e-6
                                seccion1(N1,N2)=seccion1(N1,N2)+0.2e-
6;
                            else
                                seccion1(N1,N2)=seccion1(N1,N2)+10e-
6;
                            end
                        end
                        if  densiI2(N1,N2)>densi2
                            seccion2(N1,N2)=seccion2(N1,N2)+0.2e-6;
                        end
                        if Argumentoredondeado(N1,N2)<-1
                            ff(N1,N2)=ff(N1,N2)+0.1;
                        end
                        if  densiI1(N1,N2)<=densi1 &
densiI2(N1,N2)<=densi2
                            seccioncorrecta=1;
                        end
                    end
                    %la anterior condicion seccioncorrecta==1 &
f0(N1,N2)>0.9*fmax & f0(N1,N2)<1.02*fmax & fun(N1,N2)>0

                    if seccioncorrecta==1 && ((KC~=1  &&
f0(N1,N2)>0.9*fmax && f0(N1,N2)<1.02*fmax && fun(N1,N2)>0)|| (KC==1 &&
f0(N1,N2)>0.9*fmax && f0(N1,N2)<1.02*fmax && PL(N1,N2)>=0.95*Pdeseada &&
PL(N1,N2)<1.05*Pdeseada && rend(N1,N2)>=rendimientodeseado &&
fun(N1,N2)>0 && densiI2(N1,N2)>=densi2*0.1 &&
densiI1(N1,N2)>=densi1*0.1))
                        f0(N1,N2)
                        salta=1
                        maxN1_optimo=N1
                        maxN2_optimo=N2
                        disp('soluci▯n optima')
                        opt=[N1 N2]
                        N1_optimo=N1;
                        s1_optima=seccion1(N1,N2)*1e6
                        N2_optimo=N2;
                        s2_optima=seccion2(N1,N2)*1e6
                        foptima=f0(N1,N2)
                        VC1_optima=abs(VC10(N1,N2))
                        VC2_optima=abs(VC20(N1,N2))
                        VC3_optima=abs(Vp(N1,N2))
                        VL3_optima=abs(VL3(N1,N2))
                        C1_optima=C1(N1,N2);
```

```
                            C2_optima=C2(N1,N2);
                            C3_optima=C3(N1,N2);
                            I1_optima=abs(I1(N1,N2));
                            I2_optima=abs(I2(N1,N2));
                            IC3_optima=abs(Ic3(N1,N2));
                            L3_optima=L3(N1,N2);
                            PL(N1,N2);
                            ff_optimo=ff(N1,N2);
                            rendimientoencontrado=1;
                            ya=1;
                            M_optima=M(N1,N2);
                            L1_optima=L1(N1,N2);
                            L2_optima=L2(N1,N2);
                            d1_optimo=d1(N1,N2);
                            d2_optimo=d2(N1,N2);
                            obj.Sol=true;

                        end
                        if salta==0 && N1==maxN1 && N2==maxN2

                            disp('No hay soluci▯n')
                            obj.Sol=false;
                            %indiaca que no hay sol
                            return

                        end
                    end

                end

            end
            if obj.Sol==true %solo me guarda las variables si se calcula
todo bien
                disp('programa terminado')
                obj.opt=opt;
                obj.f0=f0;
                obj.VC1=VC10;
                obj.VC2=VC20;
                obj.VC3=VC3;
                obj.VL3=VL3;
                obj.C1=C1;%condensador de acopo 1
                obj.C2=C2; %condesador de acoblo 2
                obj.C3=C3; %condensador de acoplo3
                obj.S1=seccion1;
                obj.S2=seccion2;
                obj.I1=I1;
                obj.Ip=Ip;
                obj.I2=I2;
```

```
                obj.IC1=I1;
                obj.IC3=Ic3;
                obj.IL3=I1;
                obj.IC2=I2;
                obj.PL=PL;
                obj.rend=rend;
                obj.densiI1=densiI1;
                obj.densiI2=densiI2;
                obj.ff=ff;
                obj.fun=fun;
                obj.Z2f;
                obj.Z1f;
                obj.ZL;
                obj.densiI1;
                obj.densiI2;
                obj.densi1;
                obj.densi2;
                obj.L1=L1;
                obj.L2=L2;
                obj.L3=L3;
                obj.Pcarga=Pcarga;
                obj.P1=P1;
                obj.FA=FA;
                obj.Qp=Qp;
                obj.Qs=Qs;
                obj.M=M;
                obj.k=k;
                obj.R1=R1;
                obj.R2=R2;
                obj.RL=RL;
                obj.densiI1=densiI1;
                obj.densiI2=densiI2;

                %Ahora calculamos las graficas y las dejamos guradadas
para aceder a ellas mas tarde
                ZL=RL;

                r01=sqrt(N1_optimo*s1_optima/pi);
                r02=sqrt(N2_optimo*s2_optima/pi);

                %frecuencia de trabajo
                %om0=(ff*sqrt(R1*(R2+RL)))/M;
                %om0=(sqrt(R1*(R2+RL)))/M
                om0=2*pi()*foptima;
                T=1/foptima;
                L1=0.5*4*pi*1e-7*N1_optimo^2*r1*(log(16*r1/d1_optimo)-2);
                L2=0.5*4*pi*1e-7*N2_optimo^2*r2*(log(16*r2/d2_optimo)-2);
```

```
                M=2.5*pi*pi*1e-
7*N1_optimo*N2_optimo*r1^2*r2^2/(sqrt(r2^2+h^2))^3;

                M_optima=M;
                R1_optima=5*(1/57)*N1_optimo*2*pi()*r1/(s1_optima*1e6);
                R2_optima=5*(1/57)*N2_optimo*2*pi()*r2/(s2_optima*1e6);
                Z2f=R2_optima+j*(L2_optima*om0-1/(C2_optima*om0));
                Z1f=R1_optima+j*L1_optima*om0;

                %potencia en la carga
                KM_optima=(om0*M_optima)^2;
                Z11=Z1f+KM_optima/(Z2f+ZL);
                ZTPS=(Z11/(1+Z11*j*om0*C3_optima));
                imagZTPS=imag(ZTPS);
                ZT=(Z11/(1+Z11*j*om0*C3_optima)+1/(j*om0*C1_optima));
                Ztotal=ZT+j*L3_optima*om0;
                A2=-atan(imag(Ztotal)/real(Ztotal));
                A2grados=A2*360/(2*pi);
                A2redondeado=round(A2grados);
                I1=V1/Ztotal;
                modI1=abs(I1);
                Vp=V1-I1*(1/(j*om0*C1_optima))-I1*j*L3_optima*om0;


                Ic3=Vp*j*om0*C3_optima;
                modIc3=abs(Ic3);
                Ip=I1-Ic3;
                modIp=abs(Ip);
                I2=Ip*j*om0*M_optima/(Z2f+ZL);
                I2mod=abs(I2);
                VL2=I2*j*om0*L2_optima;
                PL=RL*(abs(I2)^2);
                P1=real(V1*I1);
                %rendimiento
                rend=PL/P1
                VC1=abs(I1*(1/(j*C1_optima*om0)));
                VC2=abs(I2*(1/(j*C2_optima*om0)));
                VL=ZL*I2mod;

                for p=1:100
                    omega(p)=(0.95+0.001*p)*om0;
                    f(p)=omega(p)/(2*pi);
                    relacionfrecuencia(p)=omega(p)/om0;
                    %Z2f=R2+j*L2*om0+(1/(C2*j*om0+(1/ZL)))
                    %Z2f=1/(1/(R2+j*L2*om0)+(C2*j*om0)+(1/ZL))
                    Z2f_freq(p)=R2_optima+j*(L2_optima*omega(p)-
1/(C2_optima*omega(p)));
                    Z1f_freq(p)=R1_optima+j*(L1_optima*omega(p));
```

```
                    %potencia en la carga
                    KM_freq(p)=(omega(p)*M_optima)^2;
                    Z11_freq(p)=Z1f_freq(p)+KM_freq(p)/(Z2f_freq(p)+ZL);

ZT_freq(p)=(Z11_freq(p)/(1+Z11_freq(p)*j*omega(p)*C3_optima))+1/(j*omega(
p)*C1_optima);
                    Ztotal_freq(p)=ZT_freq(p)+j*L3_optima*omega(p);

                    A2_freq(p)=-
atan(imag(Ztotal_freq(p))/real(Ztotal_freq(p)));
                    A2grados_freq(p)=A2_freq(p)*360/(2*pi);
                    A2redondeado_freq(p)=round(A2grados_freq(p));

                    I1_freq(p)=V1/Ztotal_freq(p);
                    modI1_freq(p)=abs(I1_freq(p));
                    Vp_freq(p)=V1-I1_freq(p)*(1/(j*omega(p)*C1_optima))-
I1_freq(p)*j*L3_optima*omega(p);
                    Ic3_freq(p)=Vp_freq(p)*j*omega(p)*C3_optima;
                    modIc3_freq(p)=abs(Ic3_freq(p));
                    Ip_freq(p)=I1_freq(p)-Ic3_freq(p);
                    modIp_freq(p)=abs(Ip_freq(p));
                    I2_freq(p)=Ip_freq(p)*j*omega(p)
*M_optima/(Z2f_freq(p)+ZL);
                    modI2_freq(p)=abs(I2_freq(p));

                    PL_freq(p)=RL*(modI2_freq(p)^2);
                    P1_freq(p)=real(V1*I1_freq(p));
                    rend_freq(p)=PL_freq(p)/P1_freq(p);
                    %rendimiento

                    VC1_freq(p)=abs(I1_freq(p)*(1/
(j*C1_optima*omega(p))));
                    VC2_freq(p)=abs(I2_freq(p)*(1/
(j*C2_optima*omega(p))));
                    VL_freq(p)=abs(ZL*modI2_freq(p));

                end
                %Carga de las variables a graficas en el objeto
                obj.f=f;
                obj.modI1_freq=modI1_freq;
                obj.A2rgumentoredondeado_freq=A2grados_freq;
                obj.VL_freq =  VL_freq      ;
                obj.modI2_freq=modI2_freq;
                obj.PL_freq=PL_freq;
                obj.P1_freq= P1_freq;
                obj.rend_freq=rend_freq;
                obj.modIp_freq= modIp_freq;
```

```
                obj.modIc3_freq=modIc3_freq;
                obj.VC1_freq=VC1_freq;
                obj.VC2_freq=VC2_freq;

                %airgap


                for p=1:100
                    distancia(p)=(0.01+0.015*p)*h;
                    relaciondistancia(p)=distancia(p)/h;

                    m=4*r1*r2/((r1+r2)^2+ distancia(p)^2);
                    [K,E]=ellipke(m);
                    M_distancia(p)=0.5*4*pi*1e-7*N1*N2*sqrt((r1+r2)^2+
distancia(p)^2)*((2-m)*K-2*E);

                    %Factor de acoplamiento
                    k_distancia(p)=M_distancia(p)/
(sqrt(L1_optima*L2_optima));
                    Z2f_distancia(p)=R2_optima+j*(L2_optima*om0-
1/(C2_optima*om0));
                    Z1f_distancia(p)=R1_optima+j*(L1_optima*om0);

                    %potencia en la carga
                    KM_distancia(p)=(om0*M_distancia(p))^2;
                    Z11_distancia(p)=Z1f_distancia(p)+KM_distancia(p)/
(Z2f_distancia(p)+RL);
                    ZT_distancia(p)=(Z11_distancia(p)/
(1+Z11_distancia(p)*j*om0*C3_optima))+1/(j*om0*C1_optima);

                    Ztotal_distancia(p)=ZT_distancia(p)+j*L3_optima*om0;
                    Argumento_distancia(p)=-
atan(imag(Ztotal_distancia(p))/real(Ztotal_distancia(p)));

Argumentogrados_distancia(p)=Argumento_distancia(p)*360/(2*pi);

Argumentoredondeado_distancia(p)=round(Argumentogrados_distancia(p));

                    I1_distancia(p)=V1/Ztotal_distancia(p);
                    modI1_distancia(p)=abs(I1_distancia(p));
                    Vp_distancia(p)=V1-
I1_distancia(p)*(1/(j*om0*C1_optima))-I1_distancia(p)*j*L3_optima*om0;
                    Ic3_distancia(p)=Vp_distancia(p)*j*om0*C3_optima;
                    modIc3_distancia(p)=abs(Ic3_distancia(p));
                    Ip_distancia(p)=I1_distancia(p)-Ic3_distancia(p);
                    modIp_distancia(p)=abs(Ip_distancia(p));
                    I2_distancia(p)=Ip_distancia(p)*j*om0*
M_distancia(p)/(Z2f_distancia(p)+ZL);
```

```
                    modI2_distancia(p)=abs(I2_distancia(p));

                    PL_distancia(p)=RL*(modI2_distancia(p)^2);
                    P1_distancia(p)=real(V1*I1_distancia(p));
                    rend_distancia(p)=PL_distancia(p)/P1_distancia(p);
                    %rendimiento

                    VC1_distancia(p)=abs(I1_distancia(p)*(
1/(j*C1_optima)));
                    VC2_distancia(p)=abs(I2_distancia(p)*(
1/(j*C2_optima)));
                    VL_distancia(p)=RL*modI2_distancia(p);
                end
                %Carga de las variables a graficas en el objeto
                obj.distancia=distancia;
                obj.modI1_distancia=modI1_distancia;
                obj.Argumentoredondeado_distancia=
Argumentogrados_distancia;
                obj.VL_distancia=VL_distancia;
                obj.modI2_distancia=modI2_distancia;
                obj.PL_distancia=PL_distancia;
                obj.P1_distancia=P1_distancia;
                obj.rend_distancia=rend_distancia;
                obj.modIp_distancia=modIp_distancia;
                obj.modIc3_distancia=modIc3_distancia;
                obj.VC1_distancia=VC1_distancia;
                obj.VC2_distancia=VC2_distancia;


                for p=1:500
                    carga(p)=0.01*p*RL;
                    variacioncarga(p)=abs(carga(p))/abs(ZL);

%Z2f=R2_optima+j*L2_optima*om0+(1/(C2_optima*j*om0+(1/ZL)))

%Z2f=1/(1/(R2_optima+j*L2_optima*om0)+(C2_optima*j*om0)+(1/ZL))
                    Z2f_carga(p)=R2_optima+j*(L2_optima*om0-
1/(C2_optima*om0));
                    Z1f_carga(p)=R1_optima+j*(L1_optima*om0);

                    %potencia en la carga
                    KM_carga(p)=(om0*M_optima)^2;
                    Z11_carga(p)=Z1f_carga(p)+KM_carga(p)/
(Z2f_carga(p)+carga(p));
                    ZT_carga(p)=(Z11_carga(p)/
(1+Z11_carga(p)*j*om0*C3_optima))+1/(j*om0*C1_optima);
                    Ztotal_carga(p)=ZT_carga(p)+j*L3_optima*om0;
```

```
                    A2_carga(p)=-
atan(imag(Ztotal_carga(p))/real(Ztotal_carga(p)));
                    A2grados_carga(p)=A2_carga(p)*360/(2*pi);
                    A2redondeado_carga(p)=round(A2grados_carga(p));

                    I1_carga(p)=V1/Ztotal_carga(p);
                    modI1_carga(p)=abs(I1_carga(p));
                    Vp_carga(p)=V1-I1_carga(p)*(1/(j*om0*C1_optima))-
I1_carga(p)*j*L3_optima*om0;
                    modVp_carga(p)= abs(Vp_carga(p));
                    IC3_carga(p)=Vp_carga(p)*j*om0*C3_optima;
                    modIC3_carga(p)=abs(IC3_carga(p));
                    Ip_carga(p)=I1_carga(p)-IC3_carga(p);
                    modIp_carga(p)=abs(Ip_carga(p));

I2_carga(p)=Ip_carga(p)*j*om0*M_optima/(Z2f_carga(p)+carga(p));
                    modI2_carga(p)=abs(I2_carga(p));

                    PL_carga(p)=carga(p)*(modI2_carga(p)^2);
                    P1_carga(p)=real(V1*I1_carga(p));
                    rend_carga(p)=PL_carga(p)/P1_carga(p);
                    %rendimiento

                    VC1_carga=abs(I1_carga(p)*(1/(j*C1_optima*om0)));
                    VC2_carga=abs(I2_carga(p)*(1/(j*C2_optima*om0)));
                    VL_carga(p)=abs(carga(p)*modI2_carga(p));
                end

                obj.variacioncarga=variacioncarga;
                obj.modI1_carga=modI1_carga;
                obj.A2rgumentoredondeado_carga=A2grados_carga;
                %antes se redondeaba
                obj.VL_carga =    VL_carga ;
                obj.modI2_carga=modI2_carga;
                obj.PL_carga=PL_carga;
                obj.P1_carga=P1_carga;
                obj.rend_carga=rend_carga;
                obj.modIp_carga=modIp_carga;
                obj.modIc3_carga=modIC3_carga;
                obj.VC1_carga=VC1_carga;
                obj.VC2_carga=VC2_carga;

            end


        end

    end
```

```
end
```

A.4 Obtención condensadores SS

$$V_1 = [R_1 + j(L_1\omega - \frac{1}{C_1\omega})]I_1 - j\omega M I_2 = (R_1 + jX_1)I_1 - j\omega M I_2 = Z_1 I_1 - j\omega M I_2 \quad (1)$$

$$0 = [(R_1 + R_L) + j(L_2\omega - \frac{1}{C_2\omega})]I_2 - j\omega M I_1 = [(R_1 + R_L) + jX_2]I_2 - j\omega M I_1 = Z_2 I_2 - j\omega M I_1 \quad (2)$$

$$Z_r = \frac{\omega^2 M^2 (R_L + R_2)}{(R_L + R_2)^2 + (L_2\omega - \frac{1}{C_2\omega})^2} - j\frac{\omega^2 M^2 \left(L_2\omega - \frac{1}{C_2\omega}\right)}{(R_L + R_2)^2 + (L_2\omega - \frac{1}{C_2\omega})^2} \quad (3)$$

$$R_1 = \frac{\omega^2 M^2 (R_L + R_2)}{(R_L + R_2)^2 + (L_2\omega - \frac{1}{C_2\omega})^2} \quad (4)$$

$$\left(L_1\omega - \frac{1}{C_1\omega}\right) = \frac{\omega^2 M^2 \left(L_2\omega - \frac{1}{C_2\omega}\right)}{(R_L + R_2)^2 + (L_2\omega - \frac{1}{C_2\omega})^2} \quad (5)$$

$$\omega_{op} = \frac{1}{\sqrt{L_1 C_1}} = \frac{1}{\sqrt{L_2 C_2}} \quad (6)$$

$$\omega_{op} = \frac{\sqrt{R_1(R_2 + R_L)}}{M} \quad (7)$$

$$\eta = \frac{R_L I_2^2}{R_l I_2^2 + R_2 I_2^2 + R_1 I_1^2} = \frac{R_L}{R_L + R_2 + R_1 \left(\frac{I_1}{I_2}\right)^2} \quad (8)$$

$$\left|\frac{I_1}{I_2}\right| = \frac{R_2 + R_L}{\omega_d M} \quad (9)$$

$$\eta = \frac{R_L}{R_L + R_2 + R_1 \left(\frac{R_2 + R_L}{\omega_d M}\right)^2} = \frac{R_L}{(R_L + R_2)(1 + R\_1 \frac{(R_2 + R_L)}{\omega_d^2 M^2})} \quad (10)$$

$$\omega_d \gg \frac{\sqrt{R_1(R_2+R_L)}}{M} \Rightarrow \omega_d \gg \omega_{op} \tag{11}$$

$$\omega_d = K_\omega \omega_{op} = K_\omega \frac{\sqrt{R_1(R_2+R_L)}}{M} \tag{12}$$

$$\eta = \frac{R_L}{R_L + R_2} \tag{13}$$

$$C_2 = \frac{1}{L_2 \omega_d^2};\ C_1 = \frac{1}{L_1 \omega_d^2} \tag{140}$$

A.5 Obtención condensadores PS

$$\mathbf{0} = [\boldsymbol{R_1} + \boldsymbol{R_L} + \boldsymbol{j}(\boldsymbol{L_2\omega} - \frac{\mathbf{1}}{\boldsymbol{C_2\omega}})]\boldsymbol{I_2} - \boldsymbol{j\omega M I_p} \tag{15}$$

$$\boldsymbol{V_1} = [\boldsymbol{R_1} + \boldsymbol{j}(\boldsymbol{L_1\omega})]\boldsymbol{I_p} - \boldsymbol{j\omega M I_2} \tag{16}$$

$$\boldsymbol{I_{c1}} = \boldsymbol{V_1 j\omega C_1} \tag{17}$$

$$\boldsymbol{I_1} = \boldsymbol{I_{c1}} + \boldsymbol{I_p} \tag{18}$$

$$\boldsymbol{I_p} = \boldsymbol{I_1} - \boldsymbol{j\omega C_1 V_1} \tag{19}$$

$$\boldsymbol{I_2} = \frac{\boldsymbol{j\omega M}}{(\boldsymbol{R_2} + \boldsymbol{R_L}) + \boldsymbol{j}\left(\boldsymbol{L_2\omega} - \frac{\mathbf{1}}{\boldsymbol{C_2\omega}}\right)} \tag{20}$$

$$\boldsymbol{V_1} = \left[(\boldsymbol{R_1} + \boldsymbol{jL_1\omega}) + \frac{\boldsymbol{\omega^2 M^2}}{(\boldsymbol{R_2} + \boldsymbol{R_L}) + \boldsymbol{j}\left(\boldsymbol{L_2\omega} - \frac{\mathbf{1}}{\boldsymbol{C_2\omega}}\right)}\right]\boldsymbol{I_p} \tag{21}$$

$$\boldsymbol{V_1} = (\boldsymbol{Z_1} + \boldsymbol{Z_r})\boldsymbol{I_p} \tag{22}$$

$$\boldsymbol{Z_r} = \frac{\boldsymbol{\omega^2 M^2}}{(\boldsymbol{R_2} + \boldsymbol{R_L}) + \boldsymbol{j}\left(\boldsymbol{L_2\omega} - \frac{\mathbf{1}}{\boldsymbol{C_2\omega}}\right)} \tag{23}$$

$$\boldsymbol{R_1} = \frac{\boldsymbol{\omega_{op}}^2 \boldsymbol{M^2}(\boldsymbol{R_L} + \boldsymbol{R_2})}{(\boldsymbol{R_L} + \boldsymbol{R_2})^2 + (\boldsymbol{L_2}\,\boldsymbol{\omega_{op}} - \frac{\mathbf{1}}{\boldsymbol{C_2\omega_{op}}})^2} \tag{24}$$

$$\boldsymbol{\omega_{op}} = \frac{\sqrt{\boldsymbol{R_1}(\boldsymbol{R_2} + \boldsymbol{R_L})}}{\boldsymbol{M}} \tag{25}$$

$$\boldsymbol{\omega_d} \gg \frac{\sqrt{\boldsymbol{R_1}(\boldsymbol{R_2} + \boldsymbol{R_L})}}{\boldsymbol{M}} \Rightarrow \boldsymbol{\omega_d} \gg \boldsymbol{\omega_{op}} \tag{26}$$

$$\boldsymbol{\omega_d} = \boldsymbol{K_\omega \omega_{op}} = \boldsymbol{K_\omega}\frac{\sqrt{\boldsymbol{R_1}(\boldsymbol{R_2} + \boldsymbol{R_L})}}{\boldsymbol{M}} \tag{27}$$

$$\eta = \frac{R_L}{R_L + R_2} \tag{28}$$

$$V_1 = \left[(R_1 + jL_1\omega) + \frac{\omega^2 M^2}{(R_2 + R_L) + j\left(L_2\omega - \frac{1}{C_2\omega}\right)}\right](I_1 - j\omega C_1 V_1) \tag{29}$$

$$Z_{tot} = \frac{V_1}{I_1} = \frac{R_1 + \frac{\omega_d{}^2 M^2}{(R_2 + R_L)} + jL_1\omega_d}{1 + j\omega_d C_1\left[\left(R_1 + \frac{\omega_d{}^2 M^2}{R_2 + R_L}\right)\right]} \tag{30}$$

$$Imag(Z_{tot}) = \frac{L_1\omega_d\left(1 - L_1C_1\omega_d^2\right) - \omega_d C_1\left(R_1 + \frac{\omega_d^2 M^2}{(R_2 + R_L)}\right)^2}{\left(1 - L_1C_1\omega_d^2\right) + \omega_d^2 C_1\left(R_1 + \frac{\omega_d^2 M^2}{R_2 + R_L}\right)^2} = 0 \tag{31}$$

$$\omega_d = \frac{1}{\sqrt{L_2C_2}} \tag{32}$$

$$C_2 = \frac{1}{L_2\omega_d^2};\ C_1 = \frac{L_2C_2}{L_1 + \frac{M^4}{L_1L_2C_2R_L^2}} \tag{3833}$$

A.6 Obtención condensadores SPS

$$V_1 - \frac{1}{jC_1\omega}I_1 = (R_1 + jL_1\omega)I_p - j\omega M I_s \tag{34}$$

$$0 = [(R_2 + R_L) + j(L_2\omega - \frac{1}{C_2\omega})I_2 - j\omega M I_1 \tag{35}$$

$$I_{c3} = \left(V_1 - \frac{1}{(JC_1\omega)}I_1\right)j\omega C_3 \tag{36}$$

$$I_1 = I_{c3} + I_p \tag{37}$$

$$I_p = I_1 - \left(V_1 - \frac{1}{jC_1\omega}I_1\right)j\omega C_3 \tag{38}$$

$$I_2 = \frac{j\omega M}{(R_2 + R_L) + j\left(L_2\omega - \frac{1}{C_2\omega}\right)} I_p \tag{39}$$

$$V_1 - \frac{1}{jC_1\omega} I_1 = \left[(R_1 + jL_1\omega) + \frac{\omega^2 M^2}{(R_2 + R_L) + j\left(L_2\omega - \frac{1}{C_2\omega}\right)}\right] I_p \tag{40}$$

$$V_1 - \frac{1}{jC_1\omega} I_1 = (Z_1 + Zr) I_p \tag{41}$$

$$Z_r = \frac{\omega^2 M^2}{(R_2 + R_L) + j\left(L_2\omega - \frac{1}{C_2\omega}\right)} \tag{42}$$

$$R_1 = \frac{{\omega_{op}}^2 M^2 (R_L + R_2)}{(R_L + R_2)^2 + (L_2\,\omega_{op} - \frac{1}{C_2\omega_{op}})^2} \tag{43}$$

$$\omega_{op} = \frac{\sqrt{R_1(R_2 + R_L)}}{M} \tag{44}$$

$$\frac{I_p}{I_2} = \frac{\sqrt{(R_2 + R_L)^2 + \left(L_2\omega_d - \frac{1}{C_2\omega_d}\right)^2}}{\omega_d M} = \frac{(R_2 + R_L)}{\omega_d M} \tag{45}$$

$$\eta = \frac{R_L}{R_L + R_2 + R_1\left(\frac{(R_2 + R_L)}{\omega_d M}\right)^2} = \frac{R_L}{R_L + R_2 + (1 + R_1\frac{(R_2 + R_L)}{\omega_d M})} \tag{46}$$

$$\omega_d \gg \frac{\sqrt{R_1(R_2 + R_L)}}{M} \Rightarrow \omega_d \gg \omega_{op} \tag{47}$$

$$\omega_d = K_\omega \omega_{op} = K_\omega \frac{\sqrt{R_1(R_2 + R_L)}}{M} \tag{48}$$

$$\eta = \frac{R_L}{R_L + R_2} \tag{49}$$

$$\omega_d = \frac{1}{\sqrt{L_2 C_2}} \Rightarrow C_2 = \frac{1}{L_2\omega_d^2} \tag{55}$$

$$C_3 PS = \frac{L_2 C_2}{L_1 + \frac{M^4}{L_1 L_2 C_2 R_L^2}} \tag{506}$$