```matlab
function varargout = Principal(varargin)

% OPFGUI MATLAB code for Principal.fig
%      OPFGUI, by itself, creates a new OPFGUI or raises the existing
%      singleton*.
%
%      H = OPFGUI returns the handle to a new OPFGUI or the handle to
%      the existing singleton*.
%
%      OPFGUI('CALLBACK',hObject,eventData,handles,...) calls the local
%      function named CALLBACK in OPFGUI.M with the given input
arguments.
%
%      OPFGUI('Property','Value',...) creates a new OPFGUI or raises
the
%      existing singleton*.  Starting from the left, property value
pairs are
%      applied to the GUI before Principal_OpeningFcn gets called.  An
%      unrecognized property name or invalid value makes property
application
%      stop.  All inputs are passed to Principal_OpeningFcn via
varargin.
%
%      *See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only
one
%      instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help Principal

% Last Modified by GUIDE v2.5 12-Jan-2017 20:51:44

% Begin initialization code - DO NOT EDIT

gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @Principal_OpeningFcn, ...
                   'gui_OutputFcn',  @Principal_OutputFcn, ...
                   'gui_LayoutFcn',  [] , ...
                   'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
```

```matlab
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT


% --- Executes just before Principal is made visible.
function Principal_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to Principal (see VARARGIN)

% Choose default command line output for Principal
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes Principal wait for user response (see UIRESUME)
% uiwait(handles.figure1);
%
---------------------------------------------------------------------------
---
set(handles.uipanel_conv_profile, 'Position', [95 5 165 45]);
set(handles.axes_conv_profile, 'Position', [15 6 145 36]);
set(handles.uipanel_conv_profile1, 'Position', [95 5 165 45]);
set(handles.axes_conv_profile1, 'Position', [15 6 145 36]);
%
---------------------------------------------------------------------------
---


%---------------------------------------------------------------------------
----
guidata(hObject,handles);

% --- Outputs from this function are returned to the command line.
function varargout = Principal_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;
```

```matlab
% --- Executes on selection change in popupmenu_testsystem.
function popupmenu_testsystem_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu_testsystem (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns
popupmenu_testsystem contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu_testsystem
%Determine the selected data set.
set(handles.uipanel_singlelinediagram, 'Visible', 'on');
str=get(hObject, 'String');
val=get(hObject, 'Value');
set(handles.uipanel_singlelinediagram, 'Visible', 'on');
axes(handles.axes_singlelinediagram);
%Set current data to the selected data set
switch str{val};
    case 'Caso_9Bus';
        a=randperm(9);x1=a(1,1);x2=a(1,2);
        save bus.mat x1 x2
        handles.current_data = 'Caso_9Bus';
        im = imread('Caso_9Bus.jpg');
    case 'Caso_30Bus';

a=randperm(30);x1=a(1,1);x2=a(1,2);x3=a(1,3);x4=a(1,4);x5=a(1,5);
        save bus.mat x1 x2 x3 x4 x5
        handles.current_data = 'Caso_30Bus';
        im = imread('Caso_30Bus.jpg');
end
%Save the handles structure
image(im);
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function popupmenu_testsystem_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu_testsystem (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: popupmenu controls usually have a white background on Windows.
%        See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```matlab
% --- Executes on button press in pushbutton_singlelinediagram.
function pushbutton_singlelinediagram_Callback(hObject, eventdata,
handles)
% hObject    handle to pushbutton_singlelinediagram (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

set(handles.uipanel_singlelinediagram, 'Visible', 'on');
axes(handles.axes_singlelinediagram);

%Set current data to the selected data set
switch handles.current_data;
    case 'Caso_9Bus';
        im = imread('Caso_9Bus.jpg');
    case 'Caso_30Bus';
        im = imread('Caso_30Bus.jpg');
end
%guidata(hObject,handles);
image(im);
guidata(hObject,handles);

% --- Executes on button press in pushbutton_systemdata.
function pushbutton_systemdata_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_systemdata (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
switch handles.current_data
    case 'Caso_9Bus'
        edit Caso_9Bus;
    case 'Caso_30Bus'
        edit Caso_30Bus;
end
guidata(hObject,handles);


%------------------------------------------------------------------
----
function edit_populationsizeJANA_Callback(hObject, eventdata, handles)
% hObject    handle to edit_populationsizeJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of
edit_populationsizeJANA as text
%        str2double(get(hObject,'String')) returns contents of
edit_populationsizeJANA as a double
input = str2double(get(hObject,'string'));
```

```matlab
if isnan(input)
  errordlg('You must enter a numeric value','Invalid Input','modal')
  uicontrol(hObject)
  return
else
%  display(input);
end
%handles.pop_sizeJANA=input
handles.pop_sizeJANA = input;
guidata(hObject,handles);


% --- Executes during object creation, after setting all properties.
function edit_populationsizeJANA_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_populationsizeJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
%--------------------------------------------------------------------------
----


function edit_tmaxJANA_Callback(hObject, eventdata, handles)
% hObject    handle to edit_tmaxJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_tmaxJANA as
text
%        str2double(get(hObject,'String')) returns contents of
edit_tmaxJANA as a double
input = str2double(get(hObject,'string'));
if isnan(input)
  errordlg('You must enter a numeric value','Invalid Input','modal')
  uicontrol(hObject)
  return
else
%  display(input);
end
handles.tmaxJANA = input;
guidata(hObject,handles);
```

```matlab
% --- Executes during object creation, after setting all properties.
function edit_tmaxJANA_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_tmaxJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
%--------------------------------------------------------------------
----


function edit_numberofrunsJANA_Callback(hObject, eventdata, handles)
% hObject    handle to edit_numberofrunsJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of
edit_numberofrunsJANA as text
%        str2double(get(hObject,'String')) returns contents of
edit_numberofrunsJANA as a double
input = str2double(get(hObject,'string'));
if isnan(input)
  errordlg('You must enter a numeric value','Invalid Input','modal')
  uicontrol(hObject)
  return
else
%  display(input);
end
handles.num_runsJANA = input;
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function edit_numberofrunsJANA_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_numberofrunsJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
```

```matlab
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


function edit_constantK1JANA_Callback(hObject, eventdata, handles)
% hObject    handle to edit_constantK1JANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_constantK1JANA
as text
%        str2double(get(hObject,'String')) returns contents of
edit_constantK1JANA as a double
input = str2double(get(hObject,'string'));
if isnan(input)
  errordlg('You must enter a numeric value','Invalid Input','modal')
  uicontrol(hObject)
  return
else
%  display(input);
end
handles.K1JANA = input;
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function edit_constantK1JANA_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_constantK1JANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end



function edit_constantK2JANA_Callback(hObject, eventdata, handles)
% hObject    handle to edit_constantK2JANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_constantK2JANA
```

```matlab
as text
%         str2double(get(hObject,'String')) returns contents of
edit_constantK2JANA as a double
input = str2double(get(hObject,'string'));
if isnan(input)
  errordlg('You must enter a numeric value','Invalid Input','modal')
  uicontrol(hObject)
  return
else
%  display(input);
end
handles.K2JANA = input;
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function edit_constantK2JANA_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_constantK2JANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

% --- Executes on selection change in popupmenu_objectivefunctions.
function popupmenu_objectivefunctions_Callback(hObject, eventdata,
handles)
% hObject    handle to popupmenu_objectivefunctions (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns
popupmenu_objectivefunctions contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu_objectivefunctions
%Determine the selected data set.
str=get(hObject, 'String');
val=get(hObject, 'Value');

%Set current data to the selected data set
switch str{val};
    case 'minPotencia';
        handles.obj_fun = 'Ploss';
end
```

```matlab
%Save the handles structure
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function popupmenu_objectivefunctions_CreateFcn(hObject, eventdata,
handles)
% hObject    handle to popupmenu_objectivefunctions (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: popupmenu controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


% --- Executes on selection change in popupmenu_method.
function popupmenu_method_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu_method (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns
popupmenu_method contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu_method
%Determine the selected data set.
str=get(hObject, 'String');
val=get(hObject, 'Value');

%Set current data to the selected data set
switch str{val};
    case 'TabuSearch';
        handles.method = 'JANA';
        %set(handles.uipanel_singlelinediagram, 'Visible', 'off');
        %set(handles.uipanel_parametersJANA, 'Visible', 'on');
end
%Save the handles structure
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function popupmenu_method_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu_method (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
```

called

```matlab
% Hint: popupmenu controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


%=====================================================================
====================================================
% --- Executes on button press in pushbutton_runOPF.
function pushbutton_runOPF_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_runOPF (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%runOPF(handles.method,handles.current_data,handles.obj_fun,handles.pop
_size,handles.tmax,handles.num_runs)
switch handles.method
%--------------------------------------------------------------------
----------------------------------------------------
    case 'JANA'
     TPR=0;
     num_runsJANA=handles.num_runsJANA;
     while TPR<handles.num_runsJANA
         TPR=TPR+1;
         tic;

[Fbest,Lbest,BestChart]=JANA(handles.pop_sizeJANA,handles.tmaxJANA,hand
les.current_data,handles.obj_fun,handles.K1JANA,handles.K2JANA);
         toc;
         FBEST(TPR)=Fbest;
         LBEST(TPR,:)=Lbest;
         BESTCHART(TPR,:)=BestChart;
         TOC(TPR)=toc;
     end
     [Fbest,indFbest]=min(FBEST);
     L=LBEST(indFbest,:);
     BstCh=BESTCHART(indFbest,:);

     set(handles.uipanel_conv_profile, 'Visible', 'on');
     set(handles.uipanel_bestresults, 'Visible', 'on');
     set(handles.uipanel_conv_profile1, 'Visible', 'off')
     set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off');
     set(handles.uipanel_BusVoltages, 'Visible', 'off');
     set(handles.uipanel_BranchPower, 'Visible', 'off');
     set(handles.uipanel_Statistics, 'Visible', 'off');
     set(handles.uipanel_ViolatingConstraints, 'Visible', 'off');
```

```
        axes(handles.axes_conv_profile);
        hold on;
        plot(BstCh,'-b','LineWidth',2);
        xlabel('\fontsize{10}\bf Iteración');ylabel('\fontsize{10}\bf
Pérdidas (MW)');
        legend('\fontsize{10}\bf Tabú Search',1);grid on;hold off;

        load test.mat
        axes(handles.axes_conv_profile1);
        for count_1=1:1:iter
        hold on;
        plot(VolBus(:,count_1),':*g','LineWidth',2);
        xlabel('\fontsize{10}\bf Bus');ylabel('\fontsize{10}\bf Tensión
(p.u.)');
        %legend('\fontsize{10}\bf Tabú Search',1)
        grid on;
        hold off;
        end

[BestResults,tabela_Pg,tabela_Vg,tabela_T,tabela_Qc,Vviolat,Qgviolat,ta
bela_cvorovi,tabela_grane,Statistics]=st(L,handles.current_data,handles
.obj_fun,handles.pop_sizeJANA,handles.tmaxJANA,num_runsJANA,FBEST,TOC);
%-----------------------------------------------------------------------
------------------------------------------------------------
end
%-----------------------------------------------------------------------
-------------------------------------------------------
%BestResults
        handles.Fbest= BestResults(1);
%        Fbest=sprintf('%10.5f', handles.Fbest);
%        refreshDisplaysFbest(Fbest, handles);

        handles.Fcost= BestResults(2);
        Fcost=sprintf('%10.2f ($/h)', handles.Fcost);
        refreshDisplaysFcost(Fcost, handles);

        handles.pgub_sum= BestResults(3);
%        pgub_sum=sprintf('%3.5f (MW)',handles.pgub_sum);
%        refreshDisplaysPgubsum(pgub_sum, handles);

        handles.VD= BestResults(4);
%        VD=sprintf('%3.5f (p.u.)', handles.VD);
%        refreshDisplaysVD(VD, handles)
%-----------------------------------------------------------------------
----
%tabela_Pg
        handles.Pg=tabela_Pg;
```

```
        Pg=handles.Pg;
        refreshDisplaysPg(Pg, handles);
%tabela_Vg
        handles.Vg=tabela_Vg;
        Vg=handles.Vg;
        refreshDisplaysVg(Vg, handles);
%tabela_T
        handles.T=tabela_T;
        T=handles.T;
        refreshDisplaysT(T, handles);
%tabela_Qc
        handles.Qc=tabela_Qc;
        Qc=handles.Qc;
        refreshDisplaysQc(Qc, handles);
        %----------------------------------------------------------------
----
%tabela_cvorovi
        handles.BusVoltages=tabela_cvorovi;
        BusVoltages=handles.BusVoltages;
        refreshDisplaysBusVoltages(BusVoltages, handles);
%tabela_grane
        handles.BranchPower=tabela_grane;
        BranchPower=handles.BranchPower;
        refreshDisplaysBranchPower(BranchPower, handles);
        %----------------------------------------------------------------
----
%Statistics
        handles.Statistics=Statistics';
        Statistics=handles.Statistics;
        refreshDisplaysStatistics(Statistics, handles);
        %----------------------------------------------------------------
----
%Vviolat, Qgviolat,
        handles.Vviolating=Vviolat;
        Vviolating=handles.Vviolating;
        refreshDisplaysVviolating(Vviolating, handles);

        handles.Qgviolating=Qgviolat;
        Qgviolating=handles.Qgviolating;
        refreshDisplaysQgviolating(Qgviolating, handles);
 guidata(hObject,handles);
        %----------------------------------------------------------------
----------------------------------------------------------------
function refreshDisplaysFcost(Fcost, handles)
set(handles.edit_FcostBest, 'String', Fcost);

function refreshDisplaysPgubsum(pgub_sum, handles)
set(handles.edit_PlossBest, 'String', pgub_sum);
```

```matlab
function refreshDisplaysVD(VD, handles)
set(handles.edit_VDBest, 'String', VD);

function refreshDisplaysPg(Pg, handles)
set(handles.uitable_Pg, 'Data', Pg);

function refreshDisplaysVg(Vg, handles)
set(handles.uitable_Vg, 'Data', Vg);

function refreshDisplaysT(T, handles)
set(handles.uitable_T, 'Data', T);

function refreshDisplaysQc(Qc, handles)
set(handles.uitable_Qc, 'Data', Qc);

function refreshDisplaysBusVoltages(BusVoltages, handles)
set(handles.uitable_BusVoltages, 'Data', BusVoltages);

function refreshDisplaysBranchPower(BranchPower, handles)
set(handles.uitable_BranchPower, 'Data', BranchPower);

function refreshDisplaysStatistics(Statistics, handles)
set(handles.uitable_Statistics, 'Data', Statistics);

function refreshDisplaysVviolating(Vviolating, handles)
 if isempty(Vviolating)
 porukaVv=sprintf('Niveles de tension entre 0,95 y 1,05 p.u.');
 else
 porukaVv=sprintf('Violacion de voltaje en el bus: %3d;  ',Vviolating);
 end
 set(handles.edit_Vviolating, 'String', porukaVv);

 function refreshDisplaysQgviolating(Qgviolating, handles)
 if isempty(Qgviolating)
 porukaQgv=sprintf('Niveles de potencia reactiva dentro de los
límites');
 else
 porukaQgv=sprintf('Violacion de potencia reactiva en el bus: %3d;
',Qgviolating);
 end
 set(handles.edit_Qgviolating, 'String', porukaQgv);

%====================================================================
=====================================================

% --- Executes on button press in pushbutton_OK_JANA.
function pushbutton_OK_JANA_Callback(hObject, eventdata, handles)
```

```matlab
% hObject    handle to pushbutton_OK_JANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_parametersJANA, 'Visible', 'off');
guidata(hObject,handles);


% --- Executes on button press in pushbutton_bestresults.
function pushbutton_bestresults_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_bestresults (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'on')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);


% --- Executes on button press in pushbutton52.
function pushbutton52_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton52 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'on')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);


% --- Executes on button press in pushbutton_optimumcontrolvariables.
function pushbutton_optimumcontrolvariables_Callback(hObject,
eventdata, handles)
% hObject    handle to pushbutton_optimumcontrolvariables (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'on')
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
```

```matlab
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);


% --- Executes on button press in pushbutton_violatingconstraints.
function pushbutton_violatingconstraints_Callback(hObject, eventdata,
handles)
% hObject    handle to pushbutton_violatingconstraints (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_ViolatingConstraints, 'Visible', 'on')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
guidata(hObject,handles);


% --- Executes on button press in pushbutton_BusVoltages.
function pushbutton_BusVoltages_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_BusVoltages (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_BusVoltages, 'Visible', 'on')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);


% --- Executes on button press in pushbutton_statistics.
function pushbutton_statistics_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_statistics (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_Statistics, 'Visible', 'on')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
```

```matlab
guidata(hObject,handles);

% --- Executes on button press in pushbutton_BranchPowerFlow.
function pushbutton_BranchPowerFlow_Callback(hObject, eventdata,
handles)
% hObject    handle to pushbutton_BranchPowerFlow (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_BranchPower, 'Visible', 'on')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_bestresults, 'Visible', 'on')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);

function edit_iteration_Callback(hObject, eventdata, handles)
% hObject    handle to edit_iteration (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_iteration as
text
%        str2double(get(hObject,'String')) returns contents of
edit_iteration as a double


% --- Executes during object creation, after setting all properties.
function edit_iteration_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_iteration (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end



function edit_ObjFunBest_Callback(hObject, eventdata, handles)
% hObject    handle to edit_ObjFunBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
```

```
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_ObjFunBest as
text
%        str2double(get(hObject,'String')) returns contents of
edit_ObjFunBest as a double


% --- Executes during object creation, after setting all properties.
function edit_ObjFunBest_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_ObjFunBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


function edit_FcostBest_Callback(hObject, eventdata, handles)
% hObject    handle to edit_FcostBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_FcostBest as
text
%        str2double(get(hObject,'String')) returns contents of
edit_FcostBest as a double


% --- Executes during object creation, after setting all properties.
function edit_FcostBest_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_FcostBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```matlab
function edit_PlossBest_Callback(hObject, eventdata, handles)
% hObject    handle to edit_PlossBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_PlossBest as
text
%        str2double(get(hObject,'String')) returns contents of
edit_PlossBest as a double


% --- Executes during object creation, after setting all properties.
function edit_PlossBest_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_PlossBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end




function edit_VDBest_Callback(hObject, eventdata, handles)
% hObject    handle to edit_VDBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_VDBest as text
%        str2double(get(hObject,'String')) returns contents of
edit_VDBest as a double


% --- Executes during object creation, after setting all properties.
function edit_VDBest_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_VDBest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
```

```matlab
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end




function edit_RunCounter_Callback(hObject, eventdata, handles)
% hObject    handle to edit_RunCounter (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_RunCounter as
text
%        str2double(get(hObject,'String')) returns contents of
edit_RunCounter as a double

% --- Executes during object creation, after setting all properties.
function edit_RunCounter_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_RunCounter (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end




function edit_Vviolating_Callback(hObject, eventdata, handles)
% hObject    handle to edit_Vviolating (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_Vviolating as
text
%        str2double(get(hObject,'String')) returns contents of
edit_Vviolating as a double


% --- Executes during object creation, after setting all properties.
function edit_Vviolating_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_Vviolating (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
```

```matlab
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end




function edit_Qgviolating_Callback(hObject, eventdata, handles)
% hObject    handle to edit_Qgviolating (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit_Qgviolating as
text
%        str2double(get(hObject,'String')) returns contents of
edit_Qgviolating as a double


% --- Executes during object creation, after setting all properties.
function edit_Qgviolating_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit_Qgviolating (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

% --- Executes on button press in pushbutton_defaultJANA.
function pushbutton_defaultJANA_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton_defaultJANA (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.edit_populationsizeJANA, 'String', 50);
handles.pop_sizeJANA=25;
set(handles.edit_tmaxJANA, 'String', 100);
handles.tmaxJANA=100;
set(handles.edit_numberofrunsJANA, 'String', 5);
handles.num_runsJANA=1;
```

```matlab
set(handles.edit_constantK1JANA, 'String', 0.7);
handles.K1JANA=1;
set(handles.edit_constantK2JANA, 'String', 1.2);
handles.K2JANA=1;
guidata(hObject,handles);


% --- Executes during object creation, after setting all properties.
function uipanel_singlelinediagram_CreateFcn(hObject, eventdata,
handles)
% hObject    handle to uipanel_singlelinediagram (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called


% --- Executes during object creation, after setting all properties.
function axes_singlelinediagram_CreateFcn(hObject, eventdata, handles)
% hObject    handle to axes_singlelinediagram (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: place code in OpeningFcn to populate axes_singlelinediagram


% --- Executes on key press with focus on popupmenu_testsystem and none
of its controls.
function popupmenu_testsystem_KeyPressFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu_testsystem (see GCBO)
% eventdata  structure with the following fields (see
MATLAB.UI.CONTROL.UICONTROL)
%    Key: name of the key that was pressed, in lower case
%    Character: character interpretation of the key(s) that was
pressed
%    Modifier: name(s) of the modifier key(s) (i.e., control, shift)
pressed
% handles    structure with handles and user data (see GUIDATA)

% % --- Executes on button press in pushbutton53.
% function pushbutton53_Callback(hObject, eventdata, handles)
% % hObject    handle to pushbutton53 (see GCBO)
% % eventdata  reserved - to be defined in a future version of MATLAB
% % handles    structure with handles and user data (see GUIDATA)


% --- Executes during object creation, after setting all properties.
function pushbutton_violatingconstraints_CreateFcn(hObject, eventdata,
handles)
```

```
% hObject    handle to pushbutton_violatingconstraints (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called


% --- Executes on key press with focus on pushbutton_OK_JANA and none
of its controls.
function pushbutton_OK_JANA_KeyPressFcn(hObject, eventdata, handles)
% hObject    handle to pushbutton_OK_JANA (see GCBO)
% eventdata  structure with the following fields (see
MATLAB.UI.CONTROL.UICONTROL)
%     Key: name of the key that was pressed, in lower case
%     Character: character interpretation of the key(s) that was
pressed
%     Modifier: name(s) of the modifier key(s) (i.e., control, shift)
pressed
% handles    structure with handles and user data (see GUIDATA)


% --- Executes on key press with focus on
pushbutton_violatingconstraints and none of its controls.
function pushbutton_violatingconstraints_KeyPressFcn(hObject,
eventdata, handles)
% hObject    handle to pushbutton_violatingconstraints (see GCBO)
% eventdata  structure with the following fields (see
MATLAB.UI.CONTROL.UICONTROL)
%     Key: name of the key that was pressed, in lower case
%     Character: character interpretation of the key(s) that was
pressed
%     Modifier: name(s) of the modifier key(s) (i.e., control, shift)
pressed
% handles    structure with handles and user data (see GUIDATA)


% --- Executes on key press with focus on edit_Qgviolating and none of
its controls.
function edit_Qgviolating_KeyPressFcn(hObject, eventdata, handles)
% hObject    handle to edit_Qgviolating (see GCBO)
% eventdata  structure with the following fields (see
MATLAB.UI.CONTROL.UICONTROL)
%     Key: name of the key that was pressed, in lower case
%     Character: character interpretation of the key(s) that was
pressed
%     Modifier: name(s) of the modifier key(s) (i.e., control, shift)
pressed
% handles    structure with handles and user data (see GUIDATA)
```

```matlab
% --- Executes when selected cell(s) is changed in uitable_Pg.
function uitable_Pg_CellSelectionCallback(hObject, eventdata, handles)
% hObject    handle to uitable_Pg (see GCBO)
% eventdata  structure with the following fields (see
MATLAB.UI.CONTROL.TABLE)
%     Indices: row and column indices of the cell(s) currently
selecteds
% handles    structure with handles and user data (see GUIDATA)




function edit117_Callback(hObject, eventdata, handles)
% hObject    handle to edit117 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit117 as text
%        str2double(get(hObject,'String')) returns contents of edit117
as a double


% --- Executes during object creation, after setting all properties.
function edit117_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit117 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end



function Fbest_Callback(hObject, eventdata, handles)
% hObject    handle to Fbest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Fbest as text
%        str2double(get(hObject,'String')) returns contents of Fbest as
a double
```

```matlab
% --- Executes during object creation, after setting all properties.
function Fbest_CreateFcn(hObject, eventdata, handles)
% hObject    handle to Fbest (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


% --- Executes on button press in Reset.
function Reset_Callback(hObject, eventdata, handles)
% hObject    handle to Reset (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
set(handles.uipanel_BranchPower, 'Visible', 'off')
set(handles.uipanel_BusVoltages, 'Visible', 'off')
set(handles.uipanel_optimumcontrolvariables, 'Visible', 'off')
set(handles.uipanel_bestresults, 'Visible', 'off')
set(handles.uipanel_conv_profile, 'Visible', 'off')
set(handles.uipanel_conv_profile1, 'Visible', 'off')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
axes(handles.axes_conv_profile);
cla
axes(handles.axes_conv_profile1);
cla
guidata(hObject,handles);
```