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{:});
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;
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.
    str = get(hObject, 'String');
    val = get(hObject, 'Value');
    set(handles.uipanel_singlelinediagram, 'Visible', 'on');
    axes(handles.axes_singlelinediagram);
    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);
end

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
% --- 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);

% -- Executes on button press in edit_populationsizeJANA.
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'));
if isnan(input)
    errordlg('You must enter a numeric value','Invalid Input','modal')
    uicontrol(hObject)
    return
else
    handles.pop_sizeJANA = input;
    guidata(hObject,handles);
end

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)

% Hint: 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
    handles.tmaxJANA = input;
    guidata(hObject,handles);
% --- 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.
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);
end

% --- 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

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
%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
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

%======================================================================
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,handles.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('ontsize{10}\bf Iteración');ylabel('ontsize{10}\bf Pérdidas (MW)');
legend('ontsize{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('ontsize{10}\bf Bus');ylabel('ontsize{10}\bf Tensión (p.u.)');
%legend('ontsize{10}\bf Tabú Search',1)
grid on;
hold off;
end

[BestResults,tabela_Pg,tabela_Vg,tabela_T,tabela_Qc,Vviolat,Qgviolat,tabela_cvorovi,tabela_grane,Statistics]=st(L,handles.current_data,handles.obj_fun,handles.pop_sizeJANA,handles.tmaxJANA,num_runsJANA,FBEST,TOC);
%----------------------------------------------------------------------
%----------------------------------------------------------------------
%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);
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 limites');
    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)
% 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')
set(handles.uipanel_Statistics, 'Visible', 'off')
set(handles.uipanel_ViolatingConstraints, 'Visible', 'off')
guidata(hObject,handles);
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', 'off')
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', 'off')
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', 'off')
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')
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
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.
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
    % handles    empty - handles not created until after all CreateFcns called
% 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.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;
set(handles.edit_constantK1JANA, 'String', 0.7);
handles.K1JANA=1;
set(handles.edit_constantK2JANA, 'String', 1.2);
handles.K2JANA=1;
guida(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)
% --- 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
% --- 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);