function varargout = BME_GUI(varargin)
% BME_GUI M-file for BME_GUI.fig
% BME_GUI, by itself, creates a new BME_GUI or raises the existing
% singleton*. 
% 
% H = BME_GUI returns the handle to a new BME_GUI or the handle to 
% the existing singleton*. 
% 
% BME_GUI('CALLBACK',hObject,eventData,handles,...) calls the local
% function named CALLBACK in BME_GUI.M with the given input arguments. 
% 
% BME_GUI('Property','Value',...) creates a new BME_GUI or raises the 
% existing singleton*. Starting from the left, property value pairs are 
% applied to the GUI before BME_GUI_OpeningFunction gets called. An 
% unrecognized property name or invalid value makes property application 
% stop. All inputs are passed to BME_GUI_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 BME_GUI

% Last Modified by GUIDE v2.5 04-May-2015 00:26:21

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name', mfilename, ...
    'gui_Singleton', gui_Singleton, ...
    'gui_OpeningFcn', @BME_GUI_OpeningFcn, ...
    'gui_OutputFcn', @BME_GUI_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 BME_GUI is made visible.
function BME_GUI_OpeningFcnc(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 BME_GUI (see VARARGIN)

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

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes BME_GUI wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = BME_GUI_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;

% --- Executes on button press in PlotButton.
function PlotButton_Callback(hObject, eventdata, handles)
% hObject    handle to PlotButton (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[t, vv] = LQT2_Group3_Final(handles.g_krscale, handles.vshift_a, handles.vshift_n, handles.Bp, handles.final_time)
handles.t = t;
handles.vv = vv;
axes(handles.GraphAxes);
plot(t,vv);
xlabel('Time (msec)');
ylabel('Transmembrane Potential (mV)');
guidata(hObject,handles);

% --- Executes on button press in exportbutton.
function exportbutton_Callback(hObject, eventdata, handles)
% hObject    handle to exportbutton (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
figure;
plot(handles.t,handles.vv);

% --- Executes on button press in clearbutton.
function clearbutton_Callback(hObject, eventdata, handles)
% hObject    handle to clearbutton (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
axes(handles.GraphAxes);
cla;
% --- Executes on button press in holdbutton.
function holdbutton_Callback(hObject, eventdata, handles)
    buttonstate = get(hObject,'Value');
    if buttonstate == get(hObject,'Max')
        axes(handles.GraphAxes);
        hold all;
        set(hObject,'String','Hold All');
    elseif buttonstate == get(hObject,'Min')
        axes(handles.GraphAxes);
        hold off;
        set(hObject,'String','Hold Off');
    end

% --- Executes on button press in exitbutton.
function exitbutton_Callback(hObject, eventdata, handles)
    close;

function g_krscale_Callback(hObject, eventdata, handles)
    handles.g_krscale = str2num(get(hObject,'String'));
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function g_krscale_CreateFcn(hObject, eventdata, handles)
    handles.g_krscale = str2num(get(hObject,'String'));
guidata(hObject,handles);

% Hints: get(hObject,'String') returns contents of g_krscale as text
% str2double(get(hObject,'String')) returns contents of g_krscale as a double
    if ispc && isequal(get(hObject,'BackgroundColor'),
    get(0,'defaultUicontrolBackgroundColor'))
        set(hObject,'BackgroundColor','white');
    end
    handles.g_krscale = str2num(get(hObject,'String'));
guidata(hObject,handles);
function vshift_a_Callback(hObject, eventdata, handles)
% hObject    handle to vshift_a (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 vshift_a as text
%        str2double(get(hObject,'String')) returns contents of vshift_a as a
double
handles.vshift_a = str2num(get(hObject,'String'));
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function vshift_a_CreateFcn(hObject, eventdata, handles)
% hObject    handle to vshift_a (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
handles.vshift_a = str2num(get(hObject,'String'));
guidata(hObject,handles);

function final_time_Callback(hObject, eventdata, handles)
% hObject    handle to final_time (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 final_time as text
%        str2double(get(hObject,'String')) returns contents of final_time as a
double
handles.final_time = str2num(get(hObject,'String'));
guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function final_time_CreateFcn(hObject, eventdata, handles)
% hObject    handle to final_time (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
handles.final_time = str2num(get(hObject,'String'));
guidata(hObject,handles);
function vshift_n_Callback(hObject, eventdata, handles)
    % hObject    handle to vshift_n (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 vshift_n as text
    %        str2double(get(hObject,'String')) returns contents of vshift_n as a double
    handles.vshift_n = str2num(get(hObject,'String'));
    guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function vshift_n_CreateFcn(hObject, eventdata, handles)
    % hObject    handle to vshift_n (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
    handles.vshift_n = str2num(get(hObject,'String'));
    guidata(hObject,handles);

function Bp_Callback(hObject, eventdata, handles)
    % hObject    handle to Bp (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 Bp as text
    %        str2double(get(hObject,'String')) returns contents of Bp as a double
    handles.Bp = str2num(get(hObject,'String'));
    guidata(hObject,handles);

% --- Executes during object creation, after setting all properties.
function Bp_CreateFcn(hObject, eventdata, handles)
    % hObject    handle to Bp (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
    handles.Bp = str2num(get(hObject,'String'));
    guidata(hObject,handles);