

MATLAB EXERCISE 2.3 GUI for the dielectric-strength table of materials. Repeat MATLAB Exercise 2.1 but for the values of the dielectric strength (E_{cr}) of selected materials given in Table 2.2 (from the book). *[folder ME2_3(GUI) on IR]*

SOLUTION:

Fig.S2.3 shows the layout of the GUI.

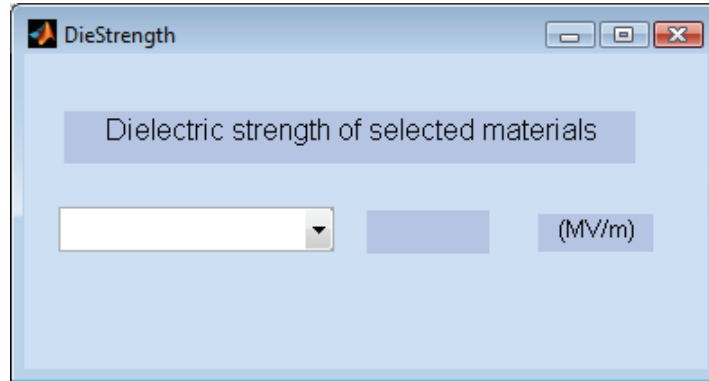


Figure S2.3 Layout of a graphical user interface (GUI) created in MATLAB to show E_{cr} values for different materials from Table 2.2 (from the book) as a pop-up menu; for MATLAB Exercise 2.3.

```
%
% Book: MATLAB-Based Electromagnetics (Pearson Prentice Hall)
% Author: Branislav M. Notaros
% Instructor Resources
% (c) 2011
%
% This MATLAB code or any part of it may be used only for
% educational purposes associated with the book
%
%
%
% GUI for the dielectric-strength table of materials

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

% Last Modified by GUIDE v2.5 30-May-2010 16:49:28

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name', mfilename, ...
                  'gui_Singleton', gui_Singleton, ...
                  'gui_OpeningFcn', @DieStrength_OpeningFcn, ...
                  'gui_OutputFcn', @DieStrength_OutputFcn, ...
                  'gui_LayoutFcn', [] , ...
                  'gui_Callback', []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
```

```
end
```

```
if nargin
```

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

```
else
```

```
    gui_mainfcn(gui_State, varargin{:});
```

```
end
```

```
% End initialization code - DO NOT EDIT
```

```
% --- Executes just before DieStrength is made visible.
```

```
function DieStrength_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 DieStrength (see VARARGIN)
```

```
% Import the adequate dielectric strength
```

```
handles.blank = '';
```

```
handles.Air = '3';
```

```
handles.Alumina = '~35';
```

```
handles.Bakelite = '25';
```

```
handles.Barium = '7.5';
```

```
handles.Freon = '~8';
```

```
handles.FusedQuartz = '~1000';
```

```
handles.GalliumArsenide = '~40';
```

```
handles.Germanium = '~10';
```

```
handles.Glass = '30';
```

```
handles.Mica = '200';
```

```
handles.Oil = '15';
```

```
handles.Paper = '15';
```

```
handles.Paraffin = '~30';
```

```
handles.Polyethylene = '47';
```

```
handles.Polystyrene = '20';
```

```
handles.Porcelain = '11';
```

```
handles.Rubber = '25';
```

```
handles.Silicon = '~30';
```

```
handles.Nitride = '~1000';
```

```
handles.Teflon = '20';
```

```
handles.Vacuum = 'inf';
```

```
handles.Wood = '~10';
```

```
% Choose default command line output for DieStrength
```

```
handles.output = hObject;
```

```
% Update handles structure
```

```
guidata(hObject, handles);
```

```
set(0, 'units', 'inches');
```

```
screenSize = get(0, 'ScreenSize');
```

```
set(hObject, 'Units', 'inches', 'Position', [screenSize(3)/2-(3.9479/2), screenSize(4)/2-4
```

```
(1.8229/2),3.9479,1.8229]);
```

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

```
% --- Outputs from this function are returned to the command line.
function varargout = DieStrength_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 selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject handle to popupmenu1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
% Determine the selected data set.
```

```
% Set current data to the selected data set.
switch get(handles.popupmenu1, 'Value')
case 1
    handles.current_data = handles.blank;
    set(handles.text3, 'String', handles.current_data);
case 2 %'Air'
    handles.current_data = handles.Air;
    set(handles.text3, 'String', handles.current_data);
case 3 %'Alumina'
    handles.current_data = handles.Alumina;
    set(handles.text3, 'String', handles.current_data);
case 4 %'Bakelite'
    handles.current_data = handles.Bakelite;
    set(handles.text3, 'String', handles.current_data);
case 5 %'Barium titanate'
    handles.current_data = handles.Barium;
    set(handles.text3, 'String', handles.current_data);
case 6 %'Freon'
    handles.current_data = handles.Freon;
    set(handles.text3, 'String', handles.current_data);
case 7 %'Fused quartz'
    handles.current_data = handles.FusedQuartz;
    set(handles.text3, 'String', handles.current_data);
case 8 %'Gallium arsenide'
    handles.current_data = handles.GalliumArsenide;
    set(handles.text3, 'String', handles.current_data);
case 9 %'Germanium'
    handles.current_data = handles.Germanium;
```

```
    set(handles.text3,'String',handles.current_data);
case 10 %'Glass (plate)'
    handles.current_data = handles.Glass;
    set(handles.text3,'String',handles.current_data);
case 11 %'Mica'
    handles.current_data = handles.Mica;
    set(handles.text3,'String',handles.current_data);
case 12 %'Oil (mineral)'
    handles.current_data = handles.Oil;
    set(handles.text3,'String',handles.current_data);
case 13 %'Paper (impregnated)'
    handles.current_data = handles.Paper;
    set(handles.text3,'String',handles.current_data);
case 14 %'Paraffin'
    handles.current_data = handles.Paraffin;
    set(handles.text3,'String',handles.current_data);
case 15 %'Polyethylene'
    handles.current_data = handles.Polyethylene;
    set(handles.text3,'String',handles.current_data);
case 16 %'Polystyrene'
    handles.current_data = handles.Polystyrene;
    set(handles.text3,'String',handles.current_data);
case 17 %'Porcelain'
    handles.current_data = handles.Porcelain;
    set(handles.text3,'String',handles.current_data);
case 18 %'Rubber (hard)'
    handles.current_data = handles.Rubber;
    set(handles.text3,'String',handles.current_data);
case 19 %'Silicon'
    handles.current_data = handles.Silicon;
    set(handles.text3,'String',handles.current_data);
case 20 %'Silicon nitride'
    handles.current_data = handles.Nitride;
    set(handles.text3,'String',handles.current_data);
case 21 %'Teflon'
    handles.current_data = handles.Teflon;
    set(handles.text3,'String',handles.current_data);
case 22 %'Vacuum'
    handles.current_data = handles.Vacuum;
    set(handles.text3,'String',handles.current_data);
case 23 %'Wood (douglas fir)'
    handles.current_data = handles.Wood;
    set(handles.text3,'String',handles.current_data);

end
% Save the handles structure.
guidata(hObject,handles)

% Hints: contents = get(hObject,'String') returns popupmenu1 contents as cell array
%         contents{get(hObject,'Value')} returns selected item from popupmenu1
```

```
% --- Executes during object creation, after setting all properties.
function popupmenu1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (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
```