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classdef app1 < matlab.apps.AppBase

% Properties that correspond to app components
properties (Access = public)
    UIFigure                matlab.ui.Figure
    GridLayout              matlab.ui.container.GridLayout
    LeftPanel                matlab.ui.container.Panel
    FrequencedecoupurePanel matlab.ui.container.Panel
    FieldFreqEditField      matlab.ui.control.NumericEditField
    FieldFreqEditFieldLabel matlab.ui.control.Label
    SliderFreq               matlab.ui.control.Slider
    SliderFreqLabel         matlab.ui.control.Label
    BandePassantePanel      matlab.ui.container.Panel
    BPLabel                  matlab.ui.control.Label
    FieldBPEditField        matlab.ui.control.NumericEditField
    FieldBPEditFieldLabel   matlab.ui.control.Label
    SliderBP                 matlab.ui.control.Slider
    SliderBPLabel           matlab.ui.control.Label
    RightPanel              matlab.ui.container.Panel
    UIAxes                   matlab.ui.control.UIAxes
end

% Properties that correspond to apps with auto-reflow
properties (Access = private)
    onePanelWidth = 576;
end

% Callbacks that handle component events
methods (Access = private)

% Value changed function: SliderBP
function SliderBPValueChanged(app, event)
    BP = app.SliderBP.Value *2*pi;
    cutoffFreq = app.SliderFreq.Value * 2*pi;
    w1=cutoffFreq;
    w2=w1+BP;
    numerator = [1,0];
    denominator = [1/w2,(w1/w2)+1,w1];
    sys = tf(numerator,denominator);
    [mag, phase, wout] = bode(sys);
    plot(app.UIAxes, wout/(2*pi), 20*log10(squeeze(mag)), 'lineWidth', 2)
    set(app.UIAxes, 'XScale', 'log', 'YScale', 'linear')
end

% Callback function
function InitialisationButtonPushed(app, event)
    w1=100*2*pi;
    w2=w1;
    BP=0;
    cutoffFreq=100;
    numerator = [1,0];
    denominator = [1/w2,(w1/w2)+1,w1];
    sys = tf(numerator,denominator);
    [mag, phase, wout] = bode(sys);
    plot(app.UIAxes, wout/(2*pi), 20*log10(squeeze(mag)), 'lineWidth', 2)
    set(app.UIAxes, 'XScale', 'log', 'YScale', 'linear')
end

% Value changed function: SliderFreq
function SliderFreqValueChanged(app, event)
    cutoffFreq = app.SliderFreq.Value *2*pi;
    BP = app.SliderBP.Value *2*pi;
    w1=cutoffFreq;
    w2=w1+BP;
    numerator = [1/w1,0];
    denominator = [1/(w1^2),3/w1,1];
    sys = tf(numerator,denominator);
    [mag, phase, wout] = bode(sys);
    plot(app.UIAxes, wout/(2*pi), 20*log10(squeeze(mag)), 'lineWidth', 2)
end

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        set(app.UIAxes, 'XScale', 'log', 'YScale', 'linear')
    end

    % Changes arrangement of the app based on UIFigure width
    function updateAppLayout(app, event)
        currentFigureWidth = app.UIFigure.Position(3);
        if(currentFigureWidth <= app.onePanelWidth)
            % Change to a 2x1 grid
            app.GridLayout.RowHeight = {480, 480};
            app.GridLayout.ColumnWidth = {'1x'};
            app.RightPanel.Layout.Row = 2;
            app.RightPanel.Layout.Column = 1;
        else
            % Change to a 1x2 grid
            app.GridLayout.RowHeight = {'1x'};
            app.GridLayout.ColumnWidth = {243, '1x'};
            app.RightPanel.Layout.Row = 1;
            app.RightPanel.Layout.Column = 2;
        end
    end
end

% Component initialization
methods (Access = private)

    % Create UIFigure and components
    function createComponents(app)

        % Create UIFigure and hide until all components are created
        app.UIFigure = uifigure('Visible', 'off');
        app.UIFigure.AutoResizeChildren = 'off';
        colormap(app.UIFigure, 'parula');
        app.UIFigure.Position = [100 100 640 480];
        app.UIFigure.Name = 'MATLAB App';
        app.UIFigure.SizeChangedFcn = createCallbackFcn(app, @updateAppLayout, true);

        % Create GridLayout
        app.GridLayout = uigridlayout(app.UIFigure);
        app.GridLayout.ColumnWidth = {243, '1x'};
        app.GridLayout.RowHeight = {'1x'};
        app.GridLayout.ColumnSpacing = 0;
        app.GridLayout.RowSpacing = 0;
        app.GridLayout.Padding = [0 0 0 0];
        app.GridLayout.Scrollable = 'on';

        % Create LeftPanel
        app.LeftPanel = uipanel(app.GridLayout);
        app.LeftPanel.Layout.Row = 1;
        app.LeftPanel.Layout.Column = 1;

        % Create BandePassantePanel
        app.BandePassantePanel = uipanel(app.LeftPanel);
        app.BandePassantePanel.Title = 'Bande Passante';
        app.BandePassantePanel.Position = [9 250 215 221];

        % Create SliderBPLabel
        app.SliderBPLabel = uilabel(app.BandePassantePanel);
        app.SliderBPLabel.HorizontalAlignment = 'right';
        app.SliderBPLabel.Position = [81 168 52 22];
        app.SliderBPLabel.Text = 'SliderBP';

        % Create SliderBP
        app.SliderBP = uislider(app.BandePassantePanel);
        app.SliderBP.Limits = [0 1000];
        app.SliderBP.ValueChangedFcn = createCallbackFcn(app, @SliderBPValueChanged, true);
        app.SliderBP.Position = [35 156 150 3];

        % Create FieldBPEditFieldLabel
        app.FieldBPEditFieldLabel = uilabel(app.BandePassantePanel);
        app.FieldBPEditFieldLabel.HorizontalAlignment = 'right';
        app.FieldBPEditFieldLabel.Position = [25 52 48 22];
        app.FieldBPEditFieldLabel.Text = 'FieldBP';

        % Create FieldBPEditField

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app.FieldBPEditField = uieditfield(app.BandePassantePanel, 'numeric');
app.FieldBPEditField.Position = [88 52 100 22];

% Create BPLabel
app.BPLabel = uilabel(app.BandePassantePanel);
app.BPLabel.Position = [90 105 28 22];
app.BPLabel.Text = 'BP: ';

% Create FrequencedecoupurePanel
app.FrequencedecoupurePanel = uipanel(app.LeftPanel);
app.FrequencedecoupurePanel.Title = 'Frequence de coupure';
app.FrequencedecoupurePanel.Position = [10 12 213 221];

% Create SliderFreqLabel
app.SliderFreqLabel = uilabel(app.FrequencedecoupurePanel);
app.SliderFreqLabel.HorizontalAlignment = 'right';
app.SliderFreqLabel.Position = [77 167 56 22];
app.SliderFreqLabel.Text = 'SliderFreq';

% Create SliderFreq
app.SliderFreq = uislider(app.FrequencedecoupurePanel);
app.SliderFreq.Limits = [100 10000];
app.SliderFreq.ValueChangedFcn = createCallbackFcn(app, @SliderFreqValueChanged, true);
app.SliderFreq.Position = [31 156 150 3];
app.SliderFreq.Value = 100;

% Create FieldFreqEditFieldLabel
app.FieldFreqEditFieldLabel = uilabel(app.FrequencedecoupurePanel);
app.FieldFreqEditFieldLabel.HorizontalAlignment = 'right';
app.FieldFreqEditFieldLabel.Position = [22 43 56 22];
app.FieldFreqEditFieldLabel.Text = 'FieldFreq';

% Create FieldFreqEditField
app.FieldFreqEditField = uieditfield(app.FrequencedecoupurePanel, 'numeric');
app.FieldFreqEditField.Position = [93 43 100 22];

% Create RightPanel
app.RightPanel = uipanel(app.GridLayout);
app.RightPanel.Layout.Row = 1;
app.RightPanel.Layout.Column = 2;

% Create UIAxes
app.UIAxes = uiaxes(app.RightPanel);
title(app.UIAxes, 'Reponse Indicielle')
xlabel(app.UIAxes, 'Fréquence f [Hz]')
ylabel(app.UIAxes, 'Gain [dB]')
zlabel(app.UIAxes, 'Z')
app.UIAxes.XLim = [100 100000];
app.UIAxes.YLim = [-50 0];
app.UIAxes.MinorGridLineStyle = '-';
app.UIAxes.XScale = 'log';
app.UIAxes.XGrid = 'on';
app.UIAxes.XMinorGrid = 'on';
app.UIAxes.YGrid = 'on';
app.UIAxes.Position = [7 180 363 267];

% Show the figure after all components are created
app.UIFigure.Visible = 'on';
end
end

% App creation and deletion
methods (Access = public)

% Construct app
function app = app1

% Create UIFigure and components
createComponents(app)

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

if nargin == 0

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        clear app
    end
end

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

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