ML_14_2 Bode plots

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%
% Chapter 14: Frequency Response Techniques: Bode plot
%
% Example 14.5: It is possible to use MATLAB to make Bode plots using
% bode(G), where G(s) = numg/deng and G is an LTI transfer-function object.
% Information about the plots obtained with bode(G) can be found by
% left-clicking the mouse on the curve. You can find the curve's label,
% as well as the coordinates of the point on which you clicked. Right
% clicking away from a curve brings up a menu if the icons on the menu bar
% are deselected. From this menu you can select (1) system responses to be
% displayed and (2) characteristics, such as peak response.
% When selected, a dot appears on the curve at the appropriate point.
% Let your mouse rest on the point to read the value of the characteristic.
% You also may select (3) which curves to view, (4) choice for grid on or off,
% (5) returning to full view after zooming, and (6) properties, such as labels,
% limits, units, style, and characteristics. It is possible to obtain points on the
plot
% using [mag,phase,w] = bode(G), where magnitude, phase, and frequency
are
% stored in mag, phase, and w, respectively, Magnitude and phase are
% stored as 3-D arrays. It is possible to use mag(:,:)',phase(:,:)' to convert the
% arrays to column vectors, where the apostrophe signifies matrix transpose.
% We now consider Example 14.5 in the text.

'(Example 14.5'          % Display label.
clf                      % Clear graph on screen.
numg=[0 4];                    % Define numerator of G(s).
deng=conv([2 1 0],[1 5 36]);         % Define denominator of G(s).
'G(s)'                   % Display label.
G=tf(numg,deng)                % Create and display G(s).
bode(G)                  % Make a Bode plot.
grid on                  % Turn on grid for Bode plot.
title('Open-Loop Frequency Response')
                         % Add a title to the Bode plot.
[mag,phase,w]=bode(G);           % Store points on the Bode plot.
points=[20*log10(mag(:,:))',phase(:,:)',w]
                         % List points on Bode plot with
                         % magnitude in dB.
```