chapter12_2_6 Modeling in the Frequency Domain for Example 12.4

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%
% Chapter 12: Modeling in the Frequency Domain
%
% Example 12.4

'Example 12.4: Non-inverting opamp'      % Display label.
syms s R1 R2 c1 c2            % Construct symbolic objects for frequency
                              % variable 's', and 'R1', 'R2', 'L', 'c', and 'V'.
R1=400E+3; R2=300E+3;     % Note: Use lower-case "c" in declaration for
c1=4E-6; c2=0.1E-6;       % capacitor.
A1=R1+1/(c1*s)   %[(R1+L*s) V;-L*s 0]       % Form Ak = A2.
A2=1/(c2*s+1/R2)      %A=[(R1+L*s) -L*s;-L*s (L*s+R2+(1/(c*s)))]
A3=1+(A2/A1)                          % Form A.
A3=simplify(A3) %I2=det(A2)/det(A);          % Use Cramer's rule to solve for
I2(s).
%I2=simple(I2);               % Reduce complexity of I2(s).
G=A3;                      % Form transfer function, G(s) = I2(s)/V(s).
'G(s)'                     % Display label.
pretty(G)                    % Pretty print G(s).
% This is complex transfer function, so we do further conversion
[numg,deng]=numden(G);       % Extract symbolic numerator and
denominator.
numg=sym2poly(numg);         % Form vector for numerator of G(s).
deng=sym2poly(deng);         % Form vector for denominator of G(s).
'LTI G(s) in Polynomial Form' % Display label.
Gtf=tf(numg,deng)            % Form and display LTI object for G(s) in
                             % polynomial form.
'LTI G(s) in Factored Form'   % Display label.

Gzpk=zpk(Gtf)                % Convert G(s) to factored form.
Pause
```