

chapter12_2_5 Modeling in the Frequency Domain for Example 12.3

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% Onwubolu, G. C.
% Mechatronics: Principles & Applications
% Elsevier
%
% Mechatronics: Principles & Applications Toolbox Version 1.0
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%
% Chapter 12: Modeling in the Frequency Domain
%
% Example 12.3

'Example 12.3: inverting amplifiers' % 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=1/(c1*s+1/R1) %[(R1+L*s) V;-L*s 0] % Form Ak = A2.
A2=R2+1/(c2*s) %A=[(R1+L*s) -L*s;-L*s (L*s+R2+(1/(c*s)))]
A3=-(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
```