

**Example 5-3 p 229 MatLab Result:**  
**Second Order Chebyshev Low-Pass Filter w/ 3 dB Ripple and  $f_c = 900$  MHz**

```
% Example 5-3 p 229: Chebyshev Low-Pass Filter

close all; % close all opened graphs
clear all; % clear all variables
figure; % open new graph

% Normalized components from filter coefficient tables
Ln1 = 3.3487; % Normalized Inductance
Ln2 = 3.3487; % Normalized Inductance
Cn1 = 0.7117; % Normalized Capacitance
Rg = 50; % Source resistance
RL = 50; % Load Resistance

wc=2*pi*900e6; % Cutoff Frequency of 900 MHz

L1=Ln1*RL/wc; % Actual L1 value
L2=Ln2*RL/wc; % Actual L2 value
C1=Cn1/(RL*wc); % Actual C1 value

f = 1;
for i=1:4000;
    w=2*pi*f;
    ZL1=j*w*L1;
    ZL2=j*w*L2;
    ZC1=1./j*w*C1;
    YC1=1./ZC1;
    GL=1./RL;

    % Define the ABCD matrices for each element of the filter

    A0=[1 Rg;0 1];
    A1=[1 ZL1;0 1];
    A2=[1 0;YC1 1];
    A3=[1 ZL2;0 1];
    A4=[1 0;GL 1];

    ABCD=A0*A1*A2*A3*A4;
    freq(i)=f;
    H(i)=2.*1/(ABCD(1));

    f=f+0.001*wc/(2*pi);
end

subplot(211), semilogx(freq,20*log10(abs(H)));grid on; ylim([-50 10]);
title('Low-Pass Filter Response');
xlabel('Frequency, Hz');
ylabel('Attenuation, dB');

phase=atan(imag(H)./real(H));
subplot(212), semilogx(freq,phase/pi*180);grid on;
xlabel('Frequency, Hz');
ylabel('Phase, deg.'');
```

