Electrical Engineering Department

EE-416 Analog Filter Design

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H.W.# 2

Due Saturday, Oct .26, 2005

1) Determine (estimate) the degrees necessary for a maximally flat, Chebyshev, inverse Chebyshev, and Cauer (elliptic) filter to meet the following requirements.

	$\alpha_{\max}[dB]$	$\alpha_{\min}[dB]$	$\omega_p[rad/s]$	$\omega_s[rad/s]$
(a)	0.1	62	900	1500
(b)	0.05	45	12 k	15 k
(c)	1.2	42	4200	5880
(d)	0.5	28	1 M	1.65 M
(e)	0.5	25	15 k	16.5 k

What is your conclusion?

2) Determine the attenuation at the frequencies $2\times\omega_s$ and $10\times\omega_s$ for case (b) of problem 1. What do you conclude?

3) Determine the transfer function of inverse Chebyshev, and Cauer (elliptic) lowpass filters that meets the following specifications

$\alpha_{\max}=0.25dB$, $\alpha_{\min}=18dB$, $\omega_p=1000rad/s$ and $\omega_s=1650rad/s$

4) Use Mat lab program to draw the magnitude and phase response for case (a) of problem 1. What do you observe?

5) Design a lowpass filter with an Inverse Chebyshev response satisfying the following specifications: $\alpha_{\max}$ =0.25 dB, $\alpha_{\min}$ =18 dB, ω_p = 1000 rad/s, ω_s =1400 rad/s. Adjust the gain so the minimum value of $\alpha(\omega)$ is 0 dB. Magnitude scale so that the element values in your circuit realization are in practical range