

Lecture 12 -- Filter Design

Draw a picture which indicates common filter parameters

How does pass band error relate to -3dB? Where is pass band phase the most dramatic?

What is the low-pass filter function prototype?

Sketch Butterworth, Chebyshev I and II and elliptic transfer functions and pz plots. How are they related?

How do you select epsilon in a filter based on pass band ripple?

How do you select the order of Butterworth and Chebyshev filters?

Use the Butterworth filter table below to pick elements for a 50 ohm filter with a 1Mrad/s cutoff

Order	R_S	C_1 a_1	L_2 a_2	C_3 a_3	L_4 a_4	C_5 a_5	L_6 a_6	C_7 a_7
1	1.0	2.0000						
2	1.0	1.4142	1.4142					
3	1.0	1.0000	2.0000	1.0000				
4	1.0	0.7654	1.8478	1.8478	0.7654			
5	1.0	0.6180	1.6180	2.0000	1.6180	0.6180		
6	1.0	0.5176	1.4142	1.9319	1.9319	1.4142	0.5176	
7	1.0	0.4450	1.2470	1.8019	2.0000	1.8019	1.2470	0.4450

How do you transform low pass filters into high pass, band pass and band stop?