

Appendix-II

Polynomials $V_N(s)$ used in Chebyshev I filter design for $\frac{1}{2}$, 1, 2, and 3 dB ripples

$$\text{Chebyshev filter } H_N(s) = \frac{K_N}{V_N(s)}, \text{ where } K_N = \begin{cases} \frac{b_0}{\sqrt{1+\epsilon^2}} & \text{for } N \text{ even} \\ b_0 & \text{for } N \text{ odd} \end{cases}$$

$$V_N(s) = s^N + b_{N-1}s^{N-1} + \dots + b_1s + b_0$$

N	b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8	b_9
a. $\frac{1}{2}$ dB Ripple ($\epsilon = 0.3493114$, $\epsilon^2 = 0.1220184$)										
1	2.8627752									
2	1.5162026	1.4256245								
3	0.7156938	1.5348954	1.2529130							
4	0.3790506	1.0254553	1.7168662	1.1973856						
5	0.1789234	0.7525181	1.3095747	1.9373675	1.1724909					
6	0.0947626	0.4323669	1.1718613	1.5897635	2.1718446	1.1591761				
7	0.0447309	0.2820722	0.7556511	1.6479029	1.8694079	2.4126510	1.1512176			
8	0.0236907	0.1525444	0.5735604	1.1485894	2.1840154	2.1492173	2.6567498	1.1460801		
9	0.0111827	0.0941198	0.3408193	0.9836199	1.6113880	2.7814990	2.4293297	2.9027337	1.1425705	
10	0.0059227	0.0492855	0.2372688	0.6269689	1.5274307	2.1442372	3.4409268	2.7097415	3.1498757	1.1400664

b. 1 dB Ripple ($\epsilon = 0.5088471$, $\epsilon^2 = 0.2589254$)										
1	1.9652267									
2	1.1025103	1.0977343								
3	0.4913067	1.2384092	0.9883412							
4	0.2756276	0.7426194	1.4539248	0.9528114						
5	0.1228267	0.5805342	0.9743961	1.6888160	0.9368201					
6	0.0689069	0.3070808	0.9393461	1.2021409	1.9308256	0.9282510				
7	0.0307066	0.2136712	0.5486192	1.3575440	1.4287930	2.1760778	0.9231228			
8	0.0172267	0.1073447	0.4478257	0.8468243	1.8369024	1.6551557	2.4230264	0.9198113		
9	0.0076767	0.0706048	0.2441864	0.7863109	1.2016071	2.3781188	1.8814798	2.6709468	0.9175476	
10	0.0043067	0.0344971	0.1824512	0.4553892	1.2444914	1.6129856	2.9815094	2.1078524	2.9194657	0.9159320

b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8	b_9
c. 2 dB Ripple ($\epsilon = 0.7647831$, $\epsilon^2 = 0.5848932$)									
1.3075603									
0.6367681	0.8038164								
0.3268901	1.0221903	0.7378216							
0.2057651	0.5167981	1.2564819	0.7162150						
0.0817225	0.4593491	0.6934770	1.4995433	0.7064606					
0.0514413	0.2102706	0.7714618	0.8670149	1.7458587	0.7012257				
0.0204228	0.1660920	0.3825056	1.1444390	1.0392203	1.9935272	0.6978929			
0.0128603	0.0729373	0.3587043	0.5982214	1.5795807	1.2117121	2.2422529	0.6960646		
0.0051076	0.0543756	0.1684473	0.6444677	0.8568648	2.0767479	1.3837464	2.4912897	0.6946793	
0.0032151	0.0233347	0.1440057	0.3177560	1.0389104	1.1585287	2.6362507	1.5557424	2.7406032	0.6936904
d. 3 dB Ripple ($\epsilon = 0.9976283$, $\epsilon^2 = 0.9952623$)									
1.0023773									
0.7079478	0.6448996								
0.2505943	0.9283480	0.5972404							
0.1769869	0.4047679	1.1691176	0.5815799						
0.0626391	0.4079421	0.5488626	1.4149847	0.5744296					
0.0442467	0.1634299	0.6990977	0.6906098	1.6628481	0.5706979				
0.0156621	0.1461530	0.3000167	1.0518448	0.8314411	1.9115507	0.5684201			
0.0110617	0.0564813	0.3207646	0.4718990	1.4666990	0.9719473	2.1607148	0.5669476		
0.0039154	0.0475900	0.1313851	0.5834984	0.6789075	1.9438443	1.1122863	2.4101346	0.5659234	
0.0027654	0.0180313	0.1277560	0.2492043	0.9499208	0.9210659	2.4834205	1.2526467	2.6597378	0.5652218