

|  | VI sem Tutorial-1 |
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| 1 | A digital IIR low pass filter is required to meet the following specifications   1. Monotonic pass-band and Monotonic stop-band 2. 3 dB pass band attenuation at 3. 20 dB stop band attenuation at   Find the system function H(z) using Bilinear transformation. Find the value of DC gain. |
| 2 | Design a Chebyshev IIR low pass filter that has to meet the following specifications   1. Passband ripple and passband edge frequency 2 rad/sec 2. Stopband attenuation ≥15.0dB and stopband edge frequency 3rad/sec |
| 3 | Design an IIR digital filter H(z) that when used in an A/D-H(z)-D/A structures will satisfy the following specifications (Use Butterworth prototype)   1. Lowpass filter with -2dB gain , cutoff at 100Hz 2. Stopband attenuation of 20dB or greater at 500Hz, 3. Sampling rate of 4000 samples/sec   Filter is designed using bilinear transformation. Find the order of the filter. |
| 4 | Design an analog Butterworth filter which had -1dB pass band attenuation at a frequency of 4 rad/sec and -20dB stop band attenuation at frequency of 8 rad/sec. |
| 5a | Design a filter using Butterworth to meet the following specification:  -2 ≤20\*log≤0 ≤0.2π  20\*log≤ - 20 0.4 π ≤ |
| 5b | Convert the analog filter with system function H(s) into digital filter using BLT.  H(s)=(s+0.1)/(s+0.1)2+5 ; Assume T=0.2sec  Write the system equation. |
| 6a | Convert the analog filter with system function  Into a digital IIR filter H(z) by means of bilinear transformation. Digital filter is to have a resonant frequency of  .  Verify the design and obtain the difference equation realization of the system |
| 6b | Obtain H(z) from H(s) if0.6s3/s3+4s2+0.9s+1  Use BLT and T=0.1sec |
| 7a | Design a single pole low pass digital filter H(z) with 3-dB bandwidth of 0.3π. Using the Bilinear transformation applied to analog filter.  Where is the 3-dB bandwidth of the analog filter.  Verify the design and obtain the difference equation realization of the system |
| 7b | Design of digital filter H(z) that when used in an A/D-H(z)-D/A structures gives an equivalent analog filter with the following specifications  Passband frequency: 1000 π rad/sec and Pass-band gain =-3.01dB  Stopband frequency: 1600 π rad/sec and Stop-band attenuation = 15 dB  Sampling frequency:2KHz  The filter is to be designed by performing a bilinear transformation on an analog system function , use Butterworth prototype and obtain the difference equation realization |