**ASSIGNMENT 3**

**V SEM ECE B (2019-20)**

1. Define IIR Filters
2. Discuss advantages and disadvantages of Digital Filters
3. Differentiate FIR and IIR Filters
4. What are the steps involved in designing IIR Filters
5. Explain Impulse invariant Transformation and draw mapping from S-plane to Z-plane
6. Derive the relation between analog and digital frequency in Impulse invariant transformation
7. Explain Bilinear transformation briefly and draw mapping from S-plane to Z-plane
8. Derive the relation between analog and digital frequency in Bilinear transformation
9. Differentiate between Bilinear Transformation and Impulse Invariant Transformation
10. What is frequency warping & Pre warping
11. Discuss Butterworth approximation
12. What are properties of Butterworth filter
13. Determine poles of Butter worth filter for order N=1,2,3,4
14. Write procedure for design of low pass digital Butterworth IIR filter
15. Discuss Chebyshev approximation
16. What are properties of Chebyshev filter
17. Design a Butterworth digital IIR low pass using Bilinear transformation by taking T=1 sec, to satisfy the following specifications. 0.707 ≤ H($e^{jw})$ ≤ 1.0 ; for 0≤ w≤ 0.45π

 H($e^{jw})$ ≤ 0.2 ; for 0.65π≤ w≤ π

1. Design a Butterworth digital IIR low pass using Impulse Invariant transformation by taking T=0.2 sec, to satisfy the following specifications. 0.8 ≤ H($e^{jw})$ ≤ 1.0 ; for 0≤ w≤ 0.4π

 H($e^{jw})$ ≤ 0.3 ; for 0.7π≤ w≤ π

1. Obtain Direct form I, Direct form II realization for the following IIR Systems

 y(n)=0.1y(n-1)+0.5y(n-2) + 0.4y(n-3)+ 0.3x(n)+0.7x(n-1)+0.8x(n-2)+2x(n-3)

1. Obtain Direct form I, Direct form II, Transposed form realizations for the following IIR Systems :

H(Z)=$\frac{Y(Z)}{X(Z)}$=$\frac{0.145Z^{- 1 }+0.1305Z^{- 2 }}{1-0.456Z^{- 1 }+0.3055Z^{- 2 }-0.099Z^{- 3 } }$

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**ASSIGNMENT 4**

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What is interpolation and decimation?

Consider a discrete time signal given by x(n)={1,3,2,5,6,4,7,9}. Determine the down sampled version of the signal for the sampling rate reduction factor D=2?

Consider a discrete time signal given by x(n)={1,3,5,6,4,7,9}. Determine the up sampled version of the signal for the sampling rate factor I=2?