Digital Signal Processing Lab

Experiment 11 - Design of Digital Butterworth filter using Bilinear Transformation and Impulse Invariant Method

I Pre-Lab Questions

1. What are the properties that are maintained same in the transfer of analog filter into a digital filter.

Soln Both Analog and Digital filters have stable and causal response. The transfer function is always a rational system with coefficient that are real numbers. Both the filters are represented by linear equations.

2. What is meant by impulse invariant method of designing IIR filter?

Soln. This method is used for designing discrete time IIR filter from continuous time filter in which the impulse response of the continuous time system is sampled to produce the impulse response of discrete time system will be a sum of shifted copies of the frequency responses of continuous time system.

3. What are the properties of Bilinear Transformation?

Soln. i) Analog DC maps to digital DC.

ii) Stability and order of transfer function is preserved.

iii) The entire $j\omega$ - axis in the S plane is mapped exactly once around one unit circle in Z-plane.