NR/R09

Code No: B5408/D7507
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
ADVANCED DIGITAL SIGNAL PROCESSING
**(COMMON TO POWER ELECTRONICS & ELECTRIC DRIVES AND CONTROL
SYSTEMS)**

Time: 3hours   **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1. a) Discuss various IIR filter realization structures and list out the merits and merits of each.
    b) Obtain the Cascade and parallel form realization structures of the given transfer function.
       $H(z) = (1+z^{-1}) / (1-o.25z^{-1})(1-z^{-1}+0.5z^{-2})$ [12]

2. a) Compare Bilinear and impulse invariant transformations of IIR filters
    b) Design a Digital Butterworth HPF using bilinear transformation technique for the following
       specifications

       $0.707 \le | H(w) | \le 1$ $; 0 \le w \le 0.2\pi$
       $| H(w) | \le 0.08 ; 0.4 \pi \le w \le \pi$ [12]

3. a) Compare FIR and IIR filters
    b) Design an FIR High pass filter using Hamming window of length 9 samples and cut-off
       frequency of 1.2 rad/s.   [12]

4. a) What is the importance of DFT in Digital Signal processing.
    b) Find 8 point DFT of the given time domain function $x(n) = cos2\pi n$.   [12]

5. a) Define Finite Word length effects and explain how these effects w.r.t IIRfilter structures.
    b) What is scaling and how it can be used to prevent saturation?   [12]

6. a) Prove that Period gram is an inconsistent estimate of power spectral density.
    b) Discuss Bartlett method of power spectrum estimation.   [12]

7. a) Discuss in detail about Addition overflow errors and their remedies.
    b) Discuss Quantization effects in detail.   [12]

8. Write short notes on
    a) Welch method of power spectrum estimation.   [6+6]
    b) Limit cycles.

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