

Code No: A3802, A6502

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations, March/April 2011

ADVANCED DIGITAL SIGNAL PROCESSING

(COMMON TO DIGITAL ELECTRONICS AND COMMUNICATION SYSTEMS,
WIRELESS AND MOBILE COMMUNICATIONS)

Time: 3hours

Max. Marks: 60

Answer any five questions
All questions carry equal marks

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- 1.a) What are the basic elements of digital signal processing system and explain the importance of each element of it.
- b) Determine the range of values of the parameter a for which the linear – invariant system with impulse response $h(n) = a^n u(n)$ is stable.
- c) Explain how digital signal processing is useful for radar? [12]
- 2.a) Define STFT? Write its properties and applications.
- b) Evaluate the frequency response of the system described by the system function $H(z) = \frac{1}{1-0.8z^{-1}}$. [6+6]
- 3.a) How over-sampling A/D converters are used to increase the sampling rate?
- b) Explain the process of sampling rate conversion by a factor I/D . [6+6]
- 4.a) Determine the impulse response of an FIR lattice filter with parameters $K_1= 0.6, K_2 = 0.3, K_3=0.5$ & $K_4=0.9$.
- b) Prove that periodogram is not a consistent estimate of the true power density spectrum. [6+6]
- 5.a) Determine the minimum MSE for Wiener filter.
- b) Write some applications of wiener filter. [6+6]
- 6.a) How to calculate the coefficient of state-space Kalman filters?
- b) Explain how orthogonality principle is used in LMS filter? [6+6]
- 7.a) Explain the principle of backward linear prediction and how it differ from forward linear prediction.
- b) Explain how a signal is restored using linear prediction models? [6+6]
- 8.a) What are the performance characteristics of Nonparametric power spectrum estimators?
- b) How Eigen analysis is used to estimate power spectrum? [6+6]

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