

Code No: C3802

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations, April 2011

ADVANCED DIGITAL SIGNAL PROCESSING

(DIGITAL ELECTRONICS & COMMUNICATION SYSTEMS)

Time: 3hours

Max. Marks: 60

Answer any five questions

All questions carry equal marks

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1. a) Explain clearly the importance of DFT in signal processing and hence bring out the procedure for implementation of DFT using FFT.
- b) Discuss clearly the role of sampling and hence bring out the necessity for multi rate sampling in DSP. [6+6]
2. a) Distinguish between Decimation and Interpolation and explain clearly to implement sample rate conversion by a rational factor I/D illustrating all the steps in detail.
- b) Bring out the role of low pass filter to be used and derive the relation for optimum cut off frequency of it in case of conversion by (I/D). Also, give the appropriate location in the implementation diagram. [6+6]
3. a) what are the issues involved in pavers spectral estimation of finite duration data using Periodogram and modified Periodogram methods.
- b) Explain clearly the Barlett method of implementation for power spectral estimation and compare it Blackman-Tukey procedure. [6+6]
4. a) Explain the modeling of finite data and compare different types of model and their applications.
- b) Discuss the relation between autocorrelation and model parameters incase of AR model and explain clearly Burg method. [6+6]
5. a) Explain the MA model for power spectral estimation and discuss the procedure for estimating the model parameter incase of MA(q) model.
- b) Explain the power spectral estimation using ARMA model and bring out its limitations and advantages. [6+6]
6. a) Explain clearly about forward prediction and backward prediction and obtain a relation between forward prediction coefficients and backward prediction coefficients of a system given by $y(n) = \sum_{k=0}^N a_k x(n-k)$.
- b) What is normal equation? Derive normal equation incase of one step prediction and provide solution for it. [6+6]
7. a) Explain clearly about quantization in ADC and the effect of it on data length. Relate length to noise power spectral density.
- b) Derive expression for truncation error in case of fixed point representation using:”
i) Sign-magnitude. ii) 1’s Compliment and iii) 2’s Compliment. [6+6]
8. Write short notes on:
 - a) Properties of linear prediction filters.
 - b) Finite word length effect in IIR filters. [6+6]
