QP Code: RO20MTECH205 Reg. No | | | | | | | | | | | AR 19

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (Second Semester Examinations) – October' 2021

MPCEC2020 – ADVANCED DIGITAL SIGNAL PROCESSING

(E.C.E)

Time: 2 hrs Maximum: 50 Marks

(The figures in the right hand margin indicate marks)

PART – A

Q.1. Answer ***ALL*** questions (2 x 10 = 20)

a. What do you mean by wrapping effect? Explain.

b. Explain the significance of Kalman filter?

c. Briefly elaborate the terms "wrap-around" and "saturating" arithmetic.

d. Justify that a FIR filter with an odd number of taps will provide a linear-phase shift function when the tap weights are symmetrical, i.e. $b_n = b_{M-n}$.

e. Write the difference between forward and backward prediction filter.

f. Establish the relation between DFT and FFT?

g. Explain the effects of finite word length in digital filters.

h. Explain the quantization errors in FFT algorithm.

i. Explain the advantages of IIR filter over FIR filter?

j. Explain the utility of oversampling in DACs? Why is it used in ADCs?

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. Derive the Yule-Walker equation for ARMA, AR and MA model in detail (6)

3. Find a relationship between the minimum-norm pseudospectrum and the all-pole model spectrum in the case of an infinite signal-to-noise ratio. (6)

4. Explain the design procedure for IIR filters using Chebyshev and Butterworth approximations. (6)

5. Find a relationship between the minimum-norm pseudospectrum and the all-pole model spectrum in the case of an infinite signal-to-noise ratio. (6)

6. What is the basic principle of parametric methods in power spectral estimation? Discuss various techniques in parametric method. (6)

7. Using the moment generating function, show that the linear transformation of a Gaussian random vector is also Gaussian**.** (6)

8. Write short notes on: (6)
   i. Spectral Estimation
   ii. Two-channel filter banks

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