B.E./Sem VII (OLD) Nov '16

ETRX

Q.P. Code : 629900

FILTER DESIGN

(3 Hours)

Max. marks : 100

NB : 1. Question No. **1** is Compulsory
2. Answer any **FOUR** questions from remaining six questions

1 (A) What are filter specifications? [05]

(B) Explain the realization of a linear phase FIR system. [05]

(C) Explain adaptive filtering. [05]

(D) What is poly phase decomposition? [05]

2 (A) What is the energy of the function, $x(n) = (0.5)^n \; ; n \geq 0$ [10]
$= (2)^n \; ; n < 0.$

(B) Find y(n), if $x(n) = n \; ; -2 \leq n \leq 1$, and [10]
$h(n) = 2^n \; ; 0 \leq n \leq 2.$

3 (A) Explain leapfrog realization of a 3rd order LPF [10]

(B) Explain the principle of a switched capacitor filter [10]

4 (A) Derive an expression for bilinear transformation [10]

(B) An analog domain filter has a T.F.: [10]

$$H_a(s) = \frac{(s + 0.1)}{(s + 0.1)^2 + 16)}.$$

This filter is to be converted into digital IIR filter by means of the bilinear transformation. The digital filter is to resonate at frequency $\omega_r = \pi/2$. Convert the analog filter into digital filter by means of the impulse- variance method.

PTO.

05 **(A)** Design an FIR filter with Hamming window technique for [10]

$H_d(\omega) = e^{-j3\omega}$: for $\pi/4 \leq |\omega| \leq 2\pi/3$.

$= 0$: otherwise

Take M = 7

(B) Calculate the filter coefficients of a band pass digital filter required to meet the following specifications: [10]

Complete signal rejection at DC and 250 Hz.

A narrow pass band centered at 125 Hz

A 3dB bandwidth of 10 Hz.

Assuming a sampling frequency of 500 Hz, obtain the transfer function of the filter by suitably placing z-plane poles and zeros, and its difference equations.

06 **(A)** Use the matched z-transform method to design a second-order band-pass filter based on the prototype filter [10]

$$H_P(s) = \frac{s}{s^2 + 0.2s + 1}$$

with a sampling interval T = 0.5 sec.

(B) Explain quadrature mirror filtering in multirate DSP [10]

07 Write short notes on : [20]

(A) Elliptical filters

(B) Frequency Dependent Negative Resistor

(C) Explain Sub band coding

(D) RLS (Recursive Least Square) algorithm in adaptive filtering

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B.E/ ETRX/ SEM VII (OLD)/ NOV/DEC '16

POWER ELECTRONICS & DRIVES.

Q.P. Code : 630401

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No.1 is compulsory.
(2) Solve any **FOUR** questions out of remaining **SIX** questions.
(3) **Figures** to the right indicate **full** marks.
(4) Assume suitable data if required.

1. Answer **any four** of the following :- **20**
   a) Discuss the different factors of selection of battery of UPS.
   b) State the need of reduction of harmonics in inverter output.
   c) Explain the operation of step down chopper.
   d) Explain stator voltage control method of Induction Motor control.
   e) Compare flyback converter with forward converter.

2. a) Explain the principle of dual converter and its use for d.c. motor control in four quadrant operation. **10**
   b) Explain the different configurations of UPS. **10**

3. a) Explain the principle of slip power recovery method and a scheme to implement the method for speed control of Induction motor. **10**
   b) Explain the effect of source inductance on the operation of single phase fully controlled converter. Draw the waveforms showing overlap period and derive the equation for output voltage. **10**

4. a) Explain the working of SMPS. **10**
   b) Explain the working of Mc Murray Bridge inverter with the help of circuit diagram and waveforms. **10**

5. a) A seperatcly excited dc motor is driven by fully controlled bridge operating at 250V, 50Hz, 1 phase supply. The motor ratings are 110V, 950 rpm, 25 A with $R_a = 0.1\ \Omega$. Find the firing angle in the following cases. **10**
      i) Motoring mode, 700 rpm speed, half the full load torque.
      ii) Braking mode, 650 rpm speed, half the full load torque.
   b) Explain the working of any voltage commutated chopper circuit using SCR's. Draw relevant voltage and current waveforms. **10**

[TURN OVER]

6. a) Explain the principle of rotor resistance control of Induction Motor with appropriate equations and graphs. State it's limitations. Also explain how the method can be implemented using chopper. 1
   b) Explain sine PWM technique used in inverter and its use in A.C. drives. 10

7. Write a note on following :- 20

a) Regenerative braking
b) V/f control of Induction motor.
c) Two quadrant type B chopper.

ETRX / Sem-VII (R-2007) / Digital Image Processing Design / Nov-16

Q.P. Code : 630300

(3Hours)

Max. Marks : 100

N.B : 1. Question No. **1** is Compulsory
2. Answer any **4** questions from the remaining six questions
3. Figures to the right indicate full marks
4. Assume suitable data if required.

1. Answer the following:
a) Explain connectivity of pixels. [05]
b) Write 4X4 transformation matrices of DFT and Hadamard transform. [05]
c) Differentiate between lossy and lossless compression. [05]
d) Explain bit plane slicing [05]

2.a) An image has the following gray level distribution: [10]

Gray Level	0	1	2	3	4	5	6	7
No. of Pixels	200	300	400	500	200	0	0	0

Perform histogram equalization and plot the original and equalized histograms.

2 b) Explain gray level slicing and digital negative operations with the help of transformation functions. [10]

3 a) With respect to image compression, mention whether the following statements are true or false and justify your answer: [10]
i) RLE does not always give image compression.
ii) DCT is preferred over DFT for transform coding

3 b) Explain morphological opening and closing with suitable examples. [10]

4 a) Explain in detail region based segmentation. [10]

4 b) Differentiate between spatial domain and frequency domain filtering giving suitable examples. [10]

5 a) What are the steps in finger print extraction? Explain in detail. [10]

5 b) Using Huffman coding find the code words for the letters in the word RECESS. [10]

6 a) State and prove any two properties of 2DDFT. [10]

6 b) Explain any one method of edge linking. [10]

7. Write short notes on any four of the following: [20]
a) Text compression
b) Color models
c) Sub band coding
d) Ringing effect
e) Vehicle number plate recognition
