

COLLEGE OF ENGINEERING, PUNE-5.

(An Autonomous Institute of Government of Maharashtra)

END SEMISTER EXAMINATION (2011-2012)

Total No of Questions: 5

Total No of Pages:2

First Year M.Tech. (Electronics and Telecommunication)
Specialization - Signal Processing

Subject: (SP 510) DSP Architecture

[Time: 3.0 Hrs.]

[Max. Marks: 50]

Year: 2011-12 (May 2012)

Instructions to candidates:

- 1) Answer all questions.
- 2) Neat Diagrams must be drawn wherever necessary.
- 3) Assume suitable data if necessary.
- 4) Figures to the right indicate full marks.
- 5) Use of non-programmable electronic calculator is allowed.

- Q.1 (a)** Show various fields of address mode register of 'C6X processor and describe AMR mode select field encoding of mode select bits. 4
- (b)** What are the different ways of invoking assembly language in C code? Write C code for the computation of Euclidian distance using callable assembly language function. 3
- (c)** Draw block diagram of Multi channel Buffer Serial Port (McBSP) and write four significant features of McBSP in 'C6X processor. 3
- Q.2 (a)** What are the various finite word length effects in digital filters? 2
- (b)** Draw modified Harvard architecture in P-DSPs and explains how it is better than Von-Neumann architecture. 3
- (c)** State the functions of following buses and on-chip peripherals in 'C5X DSPs. 5
- i) Program Bus(PB)
 - ii) Data Read Address Bus (DAB)
 - iii) Buffered Serial Port (BSP)
 - iv) TDM Serial Port
 - v) User- Maskable Interrupts

Q.3 For TMS320C6X processor explain following instructions with the help of 10 illustrative examples showing input and output.

i) MPYHL.M1 A4,A5,A6

ii) SUBDP.L2 B1:B0,B3:B2,B5:B4

iii) INTSP.L1 A1,A2

iv) LDW.D1 *+ A0[1],A1

v) MVC.S2 AMR,B2

Q.4 (a) Draw program flow unit diagram for 'C55X processor. 2

(b) Explain CDP indirect addressing mode in detail supported by 'C55X processor. 4

(c) Explain three functions supported by the Digital Clock Manager (DCM) in Xilinx Spartan3 family FPGAs. 4

Q.5 (a) Explain how protected pipeline is used to maximize the throughput in TMS320F2812 DSP processor. 5

(b) DSP has large number of interrupts sources but only few Maskable interrupt inputs. 5
How to handle this 'bottleneck'? Explain with respect to solution provided in TMS320F2812 DSP processor.

College of Engineering Pune

E & TC Department

M.Tech (Elex)(Signal Processing)

Joint Time Frequency Analysis

End Semester Examination 2012

Time:3hrs

Max. 50

Instructions:

All questions are compulsory

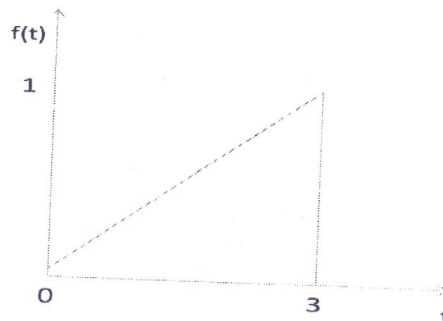
Assume suitable data if necessary

Figures to right indicates marks allotted to the questions

- Q 1
- i) State which V subspace $Y(t)$ belongs to and why ?
 - ii) Decompose the signal into V and W subspaces down the ladder and also reconstruct it.
 - iii) Establish relationship between V_j , V_{j-1} and W_{j-1} for given nested subspaces of $L_2(\mathbb{R})$.

OR

- Q 1 Do the analysis of the given signal $f(t)$ using 2 band Harr filter bank structure.



- Q 2 Using perfect reconstruction condition of conjugate quadrature filter banks, determine analysis low pass filter coefficients of Daub-4? Using the alias cancellation condition also find out the analysis HP and synthesis LP and HP coefficients of Daub-4? 5
- OR**
- Q 2 Using modified perfect reconstruction condition of conjugate quadrature filter banks determine the analysis filter coefficients for JPEG 2000 popular 5/3 bi-orthogonal tap? 5
- Q 3 Explain the need for joint time frequency analysis with the help of practical example 5
- Q 4 Explain MRA Axioms . Also explain the need for MRA
Given $x[n] = \{1, 0, -3, 2, 1, 0, 1, 2\} \in V_3$ 5
Develop complete Wavelet Packet tree till V_0 and Calculate the coefficients along with bases. Prove perfect reconstruction using the leaves from 0th subspace.
- Q 5 Given $x[n] = \{9, 7, 4, 6\} \in V_2$ 5
Develop wavelet lifting scheme, using MRA framework decompose the signal to the 0th subspace. Show perfect reconstruction. Clearly show 'split', 'update' and 'predict' stages and their outputs. Show how the computations take place *in place*?
- Q 6 Write Notes on : 10
a) Application of Wavelets in Image Compression
b) Time Frequency distributions
- Q 7 Compare FT , STFT and Wavelet transform with the help of basis functions and time frequency tilings 10
