Examination Feedback for EEE6440 – Advanced Signal Processing
Autumn Semester 2011-12

Feedback for EEE6440 Session: 2011-2012

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

This is the first time to run this course and there is no reference for past exam papers. On the whole, the performance was lower than expected. The performance of the students in Part B is a little better than in Part A. One of the main observations in Part A was that most students failed to read the question carefully. This has lead to missing parts of the questions.

Question 1:

In both parts b and c, most students fail to comment on the time and frequency domain performance based on the derived step and frequency responses.

The answers for part d were very poor. Most students did not derive the expression. Soma failed to compare the complexity for the two approaches.

For part e, most students ignored the responses required for the L-point MAF. Some students failed to identify the value of L. The comparisons were mostly incomplete.

Question 2:

Part a was attempted very badly as most students did not demonstrate the understanding of the term "basis function".

Some answers to part b demonstrated confusion in interpreting the orthogonality condition find filter coefficients. Most answers also failed to verify the orthogonality.

In part d most students forgot to show the verification of perfect reconstruction. Also they forgot to use the orthogonality properties to derive the inverse transform.

In part e most common mistake was the ignorance of the term "dyadic" decomposition

Most students failed in part f.

Part g was attempted fairly well

Question 3:

Part a was very badly answered. Students failed to identify that the shown sampling scheme represents down-sampling followed by interpolation. Therefore the Fourier transform of the output signal and the anti imaging filter bandwidths were wrong.

Part b was answered well. There was a typo in the question, resulting in stop band and pass band edges for one of the filters becoming the same frequency. This has resulted in a zero transition bandwidth and the filter length leading to zero according to the given formula. This has affected the answer to 3.b.ii., for which the full marks were awarded to 3.b.ii.

Part c was answered well.

Question 4:

4.a. Most of the students have no problems with this part.
4.b. One key point is to note that the cross-correlation sequence has the following property
$\phi_{y_1 y_2}(m) = \phi_{y_2 y_1}(-m)$.
4.c. The key is to know that for a uniformly distributed random input signal, its power is given by $(2A)^2/12$, where A is its amplitude.

Question 5:

5.a. Some students grouped the pair of zeros in a wrong way when they derive the whitening filter.
5.b. When you use the vector form to derive the solution, a clear definition of the components of the vectors is needed.

Question 6:

6.a To estimate the impulse response of the system, some students proposed to use the Wiener solution, which is wrong, since in the statement you are asked to use the method in 6.a i).
6.b. The main problem is the derivation of the LMS algorithm. You can use either the method in the notes or the one given in the lecture.