Mansoura University
Faculty of Engineering
Communication and electronics Dept

Signal Processing
Higher Graduate
4-September-2013

Time allowed: 3 hours

Q1. A signal S(n) is computed by an additive zero-mean random noise u(n),which is uncorrelated with S(n). A second measurement r(n) of the form r(n)=v(n) is made where v(n) is zero mean random noise uncorrelated with s(n).

a) Draw a block diagram to illustrate how an adaptive noise canceller can be used to enhance the signal S(n).
b) Derive an expression for estimate error for a filter of M-weights.
c) Find an expression for the weights that gives the LMS estimated error.

Q2.a . State the steps of parametric modeling of biomedical signals.

b. Using All-Pole method, Calculate the prediction coefficients of AR-Process of order m=3 for signal y(n)=[10 50 70 90 100 110 120 130 140 150], Calculate the variance and spectrum for the signal y(n).

Q.3 .a. Using Levinson recursion, calculate the prediction coefficients of AR-model of 5 samples with m=3 and y(n)=[10 20 30 40 50].

b. Describe Burg algorithm.

Q.4.a. Describe how to select the number of AR Coefficients.

b. Define the cepstra, then derive an expression for the complex cepstrum.

Q.5. Explain how to calculate the Bi-Spectral coefficients using indirect method.

With my best wishes

Dr. Marwa Ismael Obayya