EEL 6502
Homework 2
Due February 2, 2012

Problem 1

For the first order MA process

$$x(n) = u(n) + au(n-1)$$

where a is a constant, $u(n)$ is a zero mean iid sequence (white noise) with unit variance, calculate the optimal (in the MSE sense) first and second order linear predictors and the corresponding J_{min} values under the two following conditions:

      1.a. the simplest solution (even if an unrealizable filter is obtained)
      1.b. a causal filter

Problem 2

Consider the composite signal created by a superposition of a train of delayed delta functions (as in seismic signal processing)

$$x(n) = \delta(n) - \alpha\delta(n-n_0) + \alpha^2\delta(n-2n_0) - \dots$$

Calculate the optimal inverse linear filter (in the MSE sense) which deconvolves $x(n)$, i.e. which gives back the impulse excitation. Is the resulting filter minimum phase?