12.714 Problem Set Section 2 PS 02   Due Wednesday May 16, 2012

(1) For an AR(2) process defined by
X2(k+2)=-0.75*X2(k+1)-0.5*X2(k)+randn(1);
and an AR(4) process defined by
X4(k+4)=2.7607*X4(k+3)-3.8106*X4(k+2)+2.65235*X4(k+1)-0.9238*X4(k)+randn(1);
where randn is a Gaussian random variable with unit variance.
Generate and plot for a sample size of 64
    (a) The autocovariance sequence
    (b) The bias squared for the biased and unbiased periodogram estimates
    (c) Variance for the two estimators
    (d) Mean-square error for the two estimators

Problem may be solved analytically or numerically. When solved numerically, justify the number of realizations used. (25-points)

(2) Generate and plot the expected estimated sdf for the AR(2) and AR(4) processes above when discrete prolate spheroidal sequence (dpss) functions with NW=1, 2,4 and 8 are used as the data tapers in the direct spectral estimates. (25-points)