

## Exercise 2 of Assignment 8 (due 3/3/08)

Obtain Yule–Walker estimates of  $\phi_{1,2}$ ,  $\phi_{2,2}$  and  $\sigma_2^2 = \text{var}\{\epsilon_t\}$  for the stationary zero mean AR(2) process

$$X_t = \phi_{1,2}X_{t-1} + \phi_{2,2}X_{t-2} + \epsilon_t$$

using the following biased estimates of the ACVS:  $\hat{s}_0^{(p)} = 1$ ,  $\hat{s}_1^{(p)} = -1/2$  and  $\hat{s}_2^{(p)} = -1/5$ . Assuming a sampling time of unity (i.e.,  $\Delta t = 1$ ), state the corresponding estimated SDF in a reduced form (i.e, cosines rather than complex exponentials), and compute its value at frequencies  $f = 0, 1/4$  and  $1/2$  (alternatively, plot the SDF on a decibel scale versus frequency over a fine grid of frequencies, e.g.,  $f_k = k/256$  for  $k = 0, 1, \dots, 128$ ). Finally, determine the corresponding estimated ACVS at lags  $\tau = 0, 1, 2, 3, 4$  and  $5$ .