

STAT 673  
Homework 1  
due Wed. Sept. 9

Show all work.  
Please work in Groups of 2!

1. p. 31: 2.3 (b) and (c). (Hint: all are covariance stationary.)
2. Let the random variable  $X$  have a distribution with mean  $\mu$  and variance  $\sigma^2$ . Let  $Z_t = X$  for all  $t$ .
  - (a) Show that  $Z_t$  is covariance stationary.
  - (b) Find the autocovariance function of  $Z_t$ .
  - (c) What does a “typical” realization of the process look like for  $t = 1, 2, 3, 4, 5$ . Draw the time plot.

Additional Practice Problem **not** to be turned in.

3. Given random variables  $X$  and  $Y$ . Suppose  $E(X) = 2$ ,  $Var(X) = 9$ ,  $E(Y) = 0$ ,  $Var(Y) = 4$ , and  $Corr(X, Y) = 1/4$ . Find:
  - (a)  $Var(X + Y)$ .
  - (b)  $Cov(X, X + Y)$ .
  - (c)  $Corr(X + Y, X - Y)$ .