

Homework Set 10**EECS 401****Due: Friday, April 7, 2000,**
in class before lecture begins.

Things to practice: jointly Gaussian random variables, the weak law of large numbers, using the central limit theorem, describing random processes.

FYI: Parts of Chapters 4 and 5 that we have recently covered and that you should read:

- Chap 4. Sec. 4.4, conditional expectation, pp. 215-217,
- Sec. 4.5, multiple random variables, all
- Sec. 4.6, functions of random variables, pp. 221 thru middle of 223
- Sec. 4.7, expected values of functions of r.v.s's, pp. 232-235
- Sec. 4.8, jointly Gaussian random variables, pp. 237 thru middle of 242
- Sec. 4.9, mean square estimation, pp. 246-249, except we did not cover the orthogonality condition
- Chap 5.1 Sec. 5.1, pp. 269 thru middle of 271
- Sec. 5.2, pp. 275-278
- Sec. 5.3, pp. 280-285

1. 4.76, p. 264
2. 4.105 a, p. 268
3. 5.2, p. 317
4. 5.25, p. 326
5. 5.26, p. 326
6. 6.2, p. 389
7. 6.11, p. 391
8. An elementary continuous-time random process $\{X(t): -\infty < t < \infty\}$ has four equiprobable sample functions:
$$X(t,1) = 1, \quad X(t,2) = -2, \quad X(t,3) = \sin \pi t, \quad X(t,4) = \cos \pi t.$$
 - (a) Find the mean function.
 - (b) Find the autocorrelation function.
 - (c) Find $\Pr(-2.5 < X(-.5) < 2.5, -.5 < X(1) < .5)$. (Hint: It helps to draw pictures.)
 - (d) Find $\Pr(-.8 < X(-.25) < .8, -.8 < X(.25) < .8)$