

GEORGIA INSTITUTE OF TECHNOLOGY
School of Electrical and Computer Engineering

ECE 4260

Problem Set #3

Date assigned: January 25, 2017

Date due: February 3, 2017

Reading: Chapter 4 in S & W.

Reminder: Quiz #1 will be Wednesday February 15, 2017. One $8\frac{1}{2}'' \times 11''$ handwritten sheet is allowed. A table of pdf's will also be provided.

Problem 3.1

Work problem 3.24 in Stark & Woods.

Problem 3.2

Work problem 3.30 in Stark & Woods. Also find the joint pdf for the *min* and *max*.

Problem 3.3

Work problem 3.36 in Stark & Woods

(a) In the way specified in the problem.

(b) Consider the result to be the sum of two independent 1st-order chi-square densities. The resulting pdf should be the convolution of the two. Set up this convolution. (Do not attempt to solve it, although it should result in the same answer as from part (a), or the result found in Example 3.3-10.)

Problem 3.4

Work problem 3.37 in Stark & Woods.

(a) Work it this way: the two RVs, X and Y , are zero-mean, unit-variance Gaussians. The transformed RVs will also be zero-mean Gaussians. What we need to do is to find a, b, c, d such that the covariance between $aX + bY$ and $cX + dY$ is zero, i.e., $E(ZW) = 0$. The problem is way under-determined. Pick some convenient numbers that you can show will work. (Hint: A combination of 1's and -1's will work.)

(b) Refer to Figure 4.3-4. Solve the problem geometrically via a simple rotation.

Problem 3.5

Work problem 3.38 in Stark & Woods. Comment on the independence of W, V

Problem 3.6

Work problem 4.19 in Stark & Woods.

Problem 3.7

Work problem 4.20 in Stark & Woods.