Homework 5

ELEC 540: Advanced Wireless Communications
Due: 11/27/17

2 Problems, 50 points

Problems are taken from *Fundamentals of Wireless Communications,* by David Tse and Pramod Viswanath.

1. (Book Problem 6.22, 25 points)
(Selective feedback) The downlink of IS-856 has K users each experiencing i.i.d. Rayleigh fading with average SNR of 0 dB. Each user selectively feeds back the requested rate only if its channel is greater than a threshold γ. Suppose γ is chosen such that the probability that no one sends a requested rate is ϵ. Find the expected number of users that sends in a requested rate. Plot this number for K = 2, 4, 8, 16, 32, 64 and for $\epsilon = 0.1$ and $\epsilon = 0.01$. Is selective feedback effective?

2. (Book Problem 8.4 (1), 25 points)
For i.i.d. Rayleigh fading, show that the distribution of H and that of HU are identical for every unitary matrix U. This is a generalization of the rotational invariance of an i.i.d. complex Gaussian vector.