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# Homework IV

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1. Assume that there are  $L$  ( $L = 1, 2, 3, 4$ ) diversity branches of uncorrelated Rayleigh fading signals. Each branch has the same average symbol energy-to-noise power ratio  $E_s/N_0$ , for  $E_s/N_0 = 1, 3, 5, 7$ , and 9 dB. Simulate the QPSK bit error probability (at least to  $P_b = 10^{-4}$ ) for  
(a) Selective Combining; (b) Maximal Ratio Combining; (c) Equal Gain Combining; and (d) Direct Combining (which combines all paths directly and then **compensates the overall phase shift** before demodulation).  
(1. You may generate the fading gains via combining a Rayleigh random number and a uniform random phase, or via combining two Gaussian random variables (complex Gaussian). 2. For coherence detection, you must equalize the phase before demodulation.)
2. Repeat the problem for uncorrelated Ricean fading with  $K = 1$ .
3. Compare and discuss the results for different cases.
  - 助教: EECS Room 605, [TWNTHUCOM5170@gmail.com](mailto:TWNTHUCOM5170@gmail.com)
  - Due Date: 12/21 (You shall submit your paper report during the class. You shall also mail your program to the TA.)