6.973 Communication System Design   02/22/06
Problem set 2 - 802.11a Behavioral Model
due 03/01/06

Problem 1 - Broken Transmitter (45 points)

The transmitter has been intentionally broken in 3 places. Find the errors and correct them. Describe each error, what you did to correct it, and submit the code for each module that you fixed. (15 points for each error)

[NOTE: You will need to finish this problem first to complete the rest of the assignment]

Problem 2 - Soft vs. Hard Decision Receiver (25 points)

Modify the receiver so that it uses hard decision values rather than soft decision values as it does now. Submit the code for any modules that you have modified. (15 points)

[HINT: You should not have to modify the Viterbi block]

Measure and report the bit error rate for both data sets on both channel models using both hard and soft decision values (a total of 8 measurements). (10 points)

Problem 3 - Timing Estimation (15 points)

Plot the course and fine timing estimators produced by the synchronizer. (5 points for each plot)

How far apart are the respective peaks for each packet? Why are they this distance apart? (5 points)

Problem 4 - Bit Error Rate (15 points)

Modify the settings in the channel model module to create a multi-path channel with one reflection that is attenuated by a factor of 0.4 and arrives after a delay of τ. Plot the bit error rate of each data set against τ (from 1 to 7 sampling intervals).