

ELEG 5693 Assignment # 7

1. Derive the equivalent discrete-time model of a wireless communication system with quasi-static frequency-selective fading.
2. Consider a block length of N symbols transmitted over a time-varying frequency selective fading channel.
 - (a) Write the discrete-time system equation.
 - (b) Derive the sequence-based likelihood function of the received signal.
 - (c) Derive the maximum likelihood sequence estimation cost function.
3. Consider a system with QPSK modulation with the constellation diagram shown in slide 14 of the equalization chapter. The symbols are transmitted over a time-varying frequency-selective fading channel with channel length $L = 2$. The equivalent discrete-time channel impulse response is: $h_0(k) = [0.1+0.2j, 0.5-0.3j]$; $h_1(k) = [-0.3+0.9j, 1.1+0.5j]$. If the received symbols at the receiver are: $y = [0.2+1.1j, -2.1-0.8j]$. Find out what are the two symbols sent by the transmitter by using Viterbi algorithm.