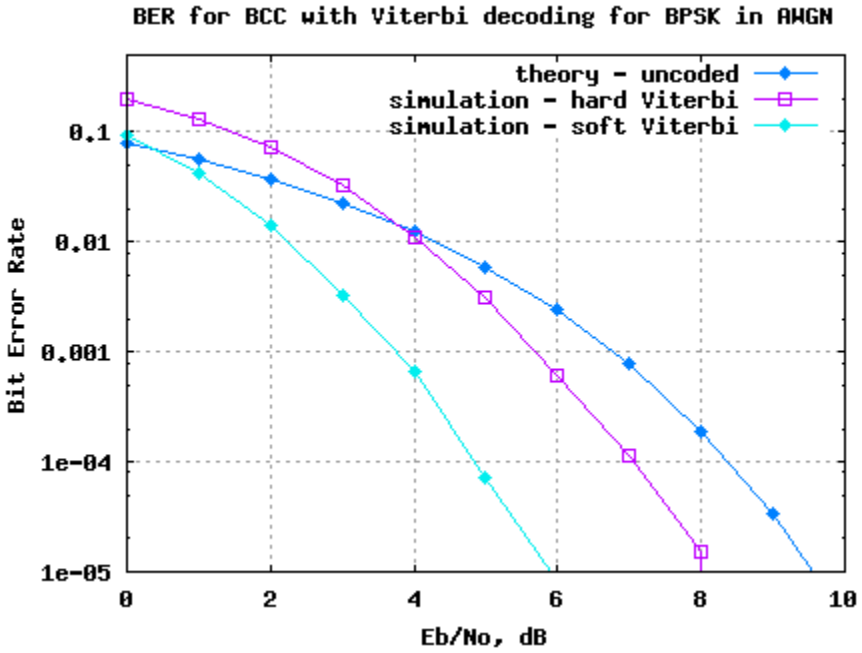
Question 1: Assume that a broadcasting system uses QPSK modulation with an $\frac{E_b}{N_0}$ of 6 dB. Find an approximation for the bit error probability if a (255, 249) RS code over $GF(2^8)$ is used. Justify any assumption you make to arrive at the approximate BER value.

Question 2: Repeat the question1 if the (255, 249) code is used as the outer code in a concatenated scheme where the inner code is a convolutional code with the following performance curve. Consider both hard and soft decision decoding.



Question 3: Consider a (63, 51) RS code over $G(2^6)$. a) What is the block length of the code in bits? What is the maximum number of erroneous symbols the code can correct? c) What is the maximum length of the bursts that the code can correct?

Note: $GF(2^m)$ is the Galois Field defined over the set of m-bit symbols. $GF(2)$ is the binary field with elements 0 and 1 and operations addition AND (as multiplication) and OR (as addition).