

EE565: Video Communications

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Homework #4

Due: Tuesday, April 17, 2007

In this homework, you will consider the problem of video transmission over Rayleigh fading channels. Assume a total bit budget of 32000 bits per second for source and channel coding (combined). You will utilize the RCPC codes of Table 3.5 of the textbook by Ngan, Yap and Tan. For each of the four channel coding rates (1/4, 1/3, 1/2, 2/3) do the following:

- Use the H.263 encoder to compress the “Foreman” sequence at the target rate that would make the total bit budget equal to 32000 bps.
- Break the bitstream into 3000-bit blocks and channel-encode each block.
- Simulate the transmission of the channel-coded bitstream over a Rayleigh fading channel with BPSK modulation and perfect interleaving. Assume that $\frac{E_b}{N_0} E\{|\alpha|^2\} = 10dB$. Clearly explain how you implemented the simulation.
- Channel-decode the received data using soft decision Viterbi decoding.
- Source-decode the data and calculate the PSNR (take the average PSNR of all frames).

Since the channel noise is random, the PSNR of the received sequence is a random variable. Thus, you need to repeat the experiments several times (at least 10) and average the PSNR).