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Differential Pulse Code Modulation (DPCM)

April 2005

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a) Select the image “Lena256B”. Select the 1-D predictor. Carry out the compression at bit rates 6 to 1 bpp. Draw the results in an PSNR-bit rate plot. Compare the results in the same plot using PCM for the same bit rates.

b) Carry out the compression for different bit rates using the other prediction models. What is the relation between the prediction model and the prediction/coding gain? Check the relation between the correlation matrix and the prediction coefficients.

c) Try to locate DPCM slope overload in a DPCM encoded image and explain this using the prediction difference image.

d) Plot an SNR-bit rate curve for the 4-th order prediction model.

e) Examine the consequences of bit errors on the DPCM compression at different error probabilities and for different prediction models. Explain the structure of the degradations observed especially the differences between the 4 prediction models.

f) Consider the “Noise256B” image, and look at the correlation structure and the resulting prediction coefficients and prediction/coding gain. Explain the numerical results observed.