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Reconstruction: Putting right what once went wrong.

An arbitrary length n binary string is transmitted m times over a probabilistic channel. This channel introduces insert, delete, and bit-flip errors with known probabilities. Given that the errors introduced in the m transmissions are independent, how large must m be such that the original string can be reconstructed with high probability? How can this reconstruction be performed efficiently?

This problem arises in numerous scenarios including computational biology and computer security. We present new results and suggest avenues for further research. (Received September 25, 2006)