The Error Exponent for Variable Length Codes over Markov Channels with Feedback *

Giacomo Como† Serdar Yüksel‡ and Sekhar Tatikonda §

Abstract

The error exponent of Markov channels with feedback is studied in the variable-length block-coding setting. Burnashev’s classic result is extended and a single letter characterization for the reliability function of finite-state Markov channels is presented, under the assumption that the channel state is causally observed both at the transmitter and at the receiver side. Tools from stochastic control theory are used in order to treat channels with intersymbol interference. In particular the convex analytical approach to Markov decision processes is adopted to handle problems with stopping time horizons arising from variable-length coding schemes.

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†Dipartimento di Matematica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10126 Torino, Italy. Was with Electrical Engineering, Yale University, New Haven, CT 06511, USA. Email: giacomo.como@polito.it

‡Mathematics and Engineering, Queen’s University, Kingston, Ontario, Canada, K7L 3N6 ON. Was with Electrical Engineering, Yale University, New Haven, CT 06511, USA. Email: yuksel@mast.queensu.ca

§Electrical Engineering, Yale University, 12 Hillhouse st, New Haven, CT 06511, USA. Email: sekhar.tatikonda@yale.edu