ENTROPY AND SEMI-MARKOV PROCESSES

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Abstract

Entropy and Markov processes are linked since the first version of the asymptotic equirepartition property (AEP) stated by Shannon in 1948 for Markov chains. We define explicitely the entropy rate for semi-Markov processes and extend the AEP or ergodic theorem of information theory to these nonstationary processes.

Among a given collection of functions satisfying constraints, selecting the one with the maximum entropy is equivalent to adding the less of information possible to the considered problem. The definition of an explicit entropy rate for processes allows one to extend the maximum entropy method to this case. We study different problems for Markov and semi-Markov processes, illustrated in reliability, queueing theory, sismology...

References:

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Key Words: asymptotic equirepartition property, entropy rate, Markov chains, Markov processes, maximum of entropy, semi-Markov processes, Shannon-McMillan-Breiman theorems.