

ONE-DIMENSIONAL ASYMPTOTICALLY HOMOGENEOUS MARKOV CHAINS: CRAMÉR TRANSFORM AND LARGE DEVIATION PROBABILITIES

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We consider a time-homogeneous ergodic Markov chain $\{X_n\}$ that takes values on the real line and has asymptotically homogeneous increments at infinity. We assume that the “limit jump” ξ of $\{X_n\}$ has negative mean and satisfies the Cramér condition, i.e., the equation $\mathbb{E}e^{\beta\xi} = 1$ has positive solution β . The asymptotic behavior of the probability $\mathbb{P}\{X_n > x\}$ is studied as $n \rightarrow \infty$ and $x \rightarrow \infty$. In particular, we distinguish the ranges of time n where this probability is asymptotically equivalent to the tail of a stationary distribution.

Key words and phrases: real-valued Markov chain, large deviation probabilities, transition phenomena, Cramér transform, invariant distribution.

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