THE RELATIONSHIP BETWEEN SPECTRAL GAP AND SPECTRAL RADIUS OF DISCRETE TIME MARKOV CHAINS

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Abstract: Let P be a reversible transition matrix. The spectral gap of P, which is denoted by $\mathrm{gap}(P)$, is defined as the distance between 1 and the rest of the spectrum of P. In this paper, we use $\mathrm{gap}(P)$ to estimate the upper and lower bounds for the spectral radius of P. Via a new-founded renewal formula, we can obtain similar results for strong ergodicity. Moreover, we also study this problem for transient Markov matrices.