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A COMBINATORIAL APPROACH TO THE CONDITIONING OF A SINGLE ENTRY IN THE STATIONARY DISTRIBUTION FOR A MARKOV CHAIN*

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Abstract. For an irreducible stochastic matrix T of order n, a certain condition number $\kappa_j(T)$ that measures the sensitivity of the $j-$th entry of the corresponding stationary distribution under perturbation of T is considered. A lower bound on κ_j is produced in terms of the directed graph of T, and the case of equality is characterized in that lower bound. Also all of the directed graphs D are characterized such that $\kappa_j(T)$ is bounded from above as T ranges over the set of irreducible stochastic matrices having directed graph D. For those D for which κ_j is bounded, a tight upper bound is given on κ_j in terms of information contained in D.

Key words. Stochastic matrix, Markov chain, Stationary vector, Condition number, Directed graph.

AMS subject classifications. 15A51, 15A18, 65F35, 60J10.

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