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Mahmud Akelbek and **Steve Kirkland*** (kirkland@math.uregina.ca), Department of Mathematics and Statistics, University of Regina, Regina, SK S4S 0A2, Canada. *Eigenvalues and the scrambling index for stochastic matrices.*

A square, entrywise nonnegative matrix with every row sum equal to 1 is known as a *stochastic matrix*. Any stochastic matrix T has 1 as an eigenvalue of largest complex modulus, and the size of the second largest (in modulus) eigenvalue of T is of interest because it determines the asymptotic rate of convergence of the sequence of powers of T .

In this talk, we introduce the notion of the scrambling index of a directed graph, and discuss some of its properties. We then use the scrambling index of the directed graph of a stochastic matrix T in order to produce an attainable upper bound on the size of the second largest eigenvalue of T . (Received September 14, 2008)