HOMER DE VERA, University of Manitoba

Minimizing Kemeny's constant for partial stochastic matrices with a single specified column

Given a finite, discrete-time, time-homogeneous Markov chain on n states with an irreducible transition matrix T, we may compute Kemeny's constant $\mathcal{K}(T)$ in terms of the eigenvalues of T. Kemeny's constant on such matrices may be interpreted in terms of the expected number of steps to get from a random initial state to a random destination state, and hence, may be viewed as average travel time on a network when the states of the Markov chain are viewed as vertices on a graph. We similarly define $\mathcal{K}(T)$ in terms of eigenvalues of a stochastic matrix T having a single essential class, an extension of irreducible stochastic matrices. Suppose we have a partial stochastic matrix where some entries are specified and the rest are unspecified, how do we choose values for the unspecified entries so that the resulting stochastic matrix has a single essential class and $\mathcal{K}(T)$ is minimized? Steve Kirkland solved this question for partial stochastic matrices where the only specified entries are the diagonal entries and where the only specified entries are in a single row. In this talk, we present our results for the case where the only specified entries are in a single column. This is a work in progress with Prof. Kirkland.