McGill Computational Science and Engineering Seminar

Friday, November 19, 2004 at 10:45 a.m.
McConnell Engineering Bldg. Room 603

Arnoldi-type Algorithms for Computing Stationary Distribution Vectors with Application to PageRank

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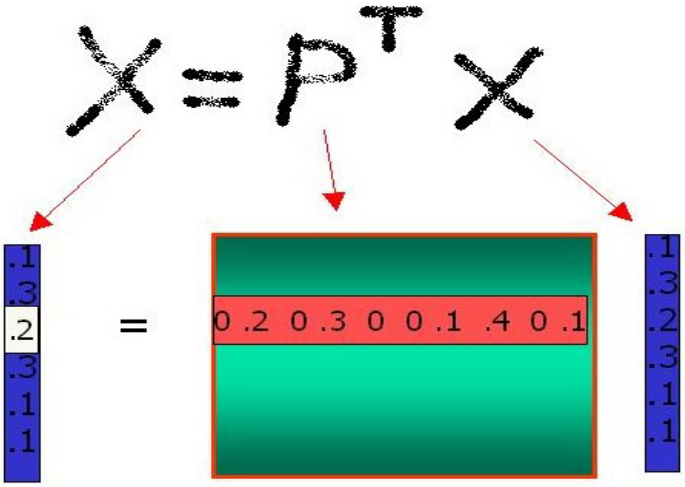
The iterative computation of the stationary distribution vector of large finite Markov chains has been receiving a lot of attention recently, mainly due to the success of Google, whose PageRank algorithm plays a major role in its search engine technology. The large size of the matrices involved precludes any possibility of using traditional decompositional techniques, and methods based on matrix-vectors products must be used.

In this talk we look at computing the stationary vector using Arnoldi-type algorithms. We focus on a refined restarted Arnoldi algorithm that relies on the fact that the largest eigenvalue of the matrix is known. Instead of computing Ritz vectors directly, a singular value decomposition approach is incorporated.

We start the talk by providing a general overview of the problem; we will then move to discuss the method we propose and some of its numerical properties. Numerical examples for a few test Markov matrices and Web matrices illustrate the performance and convergence behavior of the algorithm.



Coffee and snacks will be served at 10:30 a.m. in Room 603 before the seminar.