BAMA 5

School Year 2007—2008

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Leslie Hogben

Matrices, Digraphs, Markov Chains & Their Use by Google

Santa Clara University*, Daly Science 206

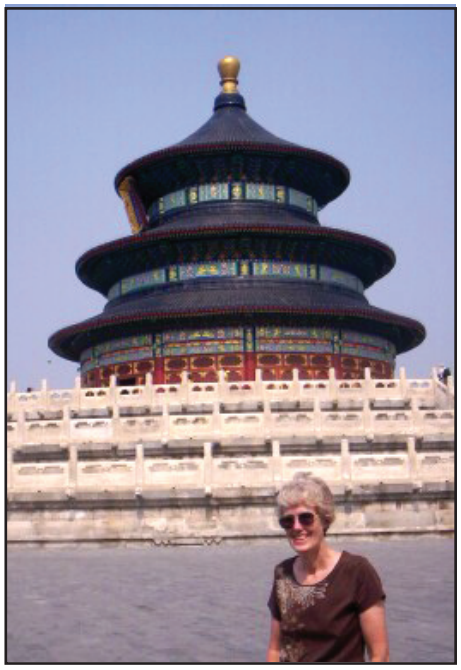
Wednesday, February 27, 7:30 pm

Matrices are rectangular arrays of numbers, and are used to model many problems - they are especially good for representing data in a computer. Square matrices can be added and multiplied.

Directed graphs (***digraphs***) model connections by vertices and arcs. For example, cities and direct flights, or web pages and links.

A ***Markov chain*** is a matrix description of a random process, such as navigating the web (your choice of which link to click is not random but all users together can be modeled by a random process).

One of the things that makes Google so effective is its PageRank algorithm, which places at the top of the list the pages you want (out of thousands or millions of hits). PageRank models the web as a digraph and uses a Markov chain based on this digraph to rank the pages.



Leslie Hogben is the Associate Director for Program Diversity of the American Institute of Mathematics and is a professor of mathematics at Iowa State University. She received her Ph.D. in 1978 from Yale University. Originally working in nonassociative algebra, she shifted her research focus to linear algebra, especially combinatorial matrix theory. She particularly enjoys doing research with graduate and undergraduate students. Hogben is an associate editor of Linear Algebra and Its Applications, editor of Handbook of Linear Algebra, and the Assistant Secretary/Treasurer of the International Linear Algebra Society.

*** See back for map and directions.**

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