Tuchman, Allan M.; Berry, Michael W.

The authors propose to present a matrix as a square (or rectangular) figure on a screen, with colors of pixels corresponding to ranges of magnitudes of elements of the matrix (or, for very large matrices, corresponding to small blocks of matrix elements). The presentation of the colors is a very fast operation; they propose the use of this graphics tool to study convergence patterns for iterative algorithms whose detailed behavior is not well understood (such as Jacobi iteration for eigenvalues of large matrices with eigenvalue clusters).

Reviewer: H. Guggenheimer (West Hempstead)

MSC:
65D18 Numerical aspects of computer graphics, image analysis, and computational geometry
68U05 Computer graphics; computational geometry (digital and algorithmic aspects)
65F10 Iterative numerical methods for linear systems
65F15 Numerical computation of eigenvalues and eigenvectors of matrices

Keywords:
matrix visualization; design of numerical algorithms; interactive computer graphics for algorithm designs; optimal design; convergence patterns; iterative algorithms; Jacobi iteration; eigenvalues

Software:
EISPACK

Full Text: DOI Link