Nonnegative matrices in the mathematical sciences

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Abstrak

Here is a valuable text and research tool for scientists and engineers who use or work with theory and computation associated with practical problems relating to Markov chains and queuing networks, economic analysis, or mathematical programming. Originally published in 1979, this new edition adds material that updates the subject relative to developments from 1979 to 1993.
Theory and applications of nonnegative matrices are blended here, and extensive references are included in each area. You will be led from the theory of positive operators via the Perron-Frobenius theory of nonnegative matrices and the theory of inverse positivity, to the widely used topic of M-matrices. On the way, semigroups of nonnegative matrices and symmetric nonnegative matrices are discussed. Later, applications of nonnegativity and M-matrices are given; for numerical analysis the example is convergence theory of iterative methods, for probability and statistics the examples are finite Markov chains and queuing network models, for mathematical economics the example is input-output models, and for mathematical programming the example is the linear complementarity problem.
Nonnegativity constraints arise very naturally throughout the physical world. Engineers, applied mathematicians, and scientists who encounter nonnegativity or generalizations of nonegativity in their work will benefit from topics covered here, connecting them to relevant theory. Researchers in one area, such as queuing theory, may find useful the techniques involving nonnegative matrices used by researchers in another area, say, mathematical programming.