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Whilst it is a moot point amongst researchers, linear algebra is an important component in the study of graphs. This book illustrates the elegance and power of matrix techniques in the study of graphs by means of several results, both classical and recent. The emphasis on matrix techniques is greater than other standard references on algebraic graph theory, and the important matrices associated with graphs such as incidence, adjacency and Laplacian matrices are treated in detail.

Presenting a useful overview of selected topics in algebraic graph theory, early chapters of the text focus on regular graphs, algebraic connectivity, the distance matrix of a tree, and its generalized version for arbitrary graphs, known as the resistance matrix. Coverage of later topics include Laplacian eigenvalues of threshold graphs, the positive definite completion problem and matrix games based on a graph.

Such an extensive coverage of the subject area provides a welcome prompt for further exploration, and the inclusion of exercises enables practical learning throughout the book. It may also be applied to a selection of sub-disciplines within science and engineering.

Whilst this book will be invaluable to students and researchers in graph theory and combinatorial matrix theory who want to be acquainted with matrix theoretic ideas used in graph theory, it will also benefit a wider, cross-disciplinary readership.