
In this complete introduction to the theory of finding derivatives of scalar-, vector-, and matrix-valued functions in relation to complex matrix variables, Hjørungnes describes an essential set of mathematical tools for solving problems where unknown parameters are contained in complex-valued matrices. Self-contained and easy to follow, this singular reference uses numerous practical examples from signal processing and communications to demonstrate how these tools can be used to analyze and optimize the performance of engineering systems. This is the first book on complex-valued matrix derivatives from an engineering perspective. It covers both unpatterned and patterned matrices, uses the latest research examples to illustrate concepts, and includes applications in a range of areas, such as wireless communications, control theory, adaptive filtering, resource management, and digital signal processing. The book includes eighty-one end-of-chapter exercises and a complete solutions manual (available on the Web).

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