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Sinopsis

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This is a basic text for graduate and advanced undergraduate study in those areas of mathematical analysis that are of primary concern to the engineer and the physicist, most particularly analysis and design of finite processes that approximate the solution of an analytical problem. The work comprises seven chapters:

Chapter I (Algebraic Equations) deals with the search for roots of algebraic equations encountered in vibration and flutter problems and in those of static and dynamic stability. Useful computing techniques are discussed, in particular the Bernoulli method and its ramifications.

Chapter II (Matrices and Eigenvalue Problems) is devoted to a systematic development of the properties of matrices, especially in the context of industrial research.

Chapter III (Large-Scale Linear Systems) discusses the "spectroscopic method" of finding the real eigenvalues of large matrices and the corresponding method of solving large-scale linear equations as well as an additional treatment of a perturbation problem and other topics.

Chapter IV (Harmonic Analysis) deals primarily with the interpolation aspects of the Fourier series and its flexibility in representing empirically given equidistant data.

Chapter V (Data Analysis) deals with the problem of reduction of data and of obtaining the first and even second derivatives of an empirically given function _ constantly encountered in tracking problems in curve-fitting problems. Two methods of smoothing are discussed: smoothing in the small and smoothing in the large