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Nota di contenuto	Preface -- Introduction -- 1 Operators -- 2 Solution of homogeneous and inhomogeneous linear equations -- 3 First order homogeneous and inhomogeneous linear equations -- 4 Second-order homogeneous and inhomogeneous equations -- 5 Self-adjoint linear equations -- 6 Green's function -- 7 Generating function, z-transforms, Laplace transforms and the solution of linear differential and difference equations -- 8 Dictionary of difference equations with polynomial coefficients -- Appendix A: Difference operator -- Appendix B: Notation -- Appendix C: Wronskian Determinant -- Appendix D: Casoratian Determinant -- Appendix E: Cramer's Rule -- Appendix F:

Green’s function and the Superposition principle -- Appendix G: Inverse Laplace transforms and Inverse Generating functions -- Appendix H: Hypergeometric function -- Appendix I: Confluent Hypergeometric function -- Appendix J. Solutions of the second kind -- Bibliography.

Sommario/riassunto

This book, intended for researchers and graduate students in physics, applied mathematics and engineering, presents a detailed comparison of the important methods of solution for linear differential and difference equations - variation of constants, reduction of order, Laplace transforms and generating functions - bringing out the similarities as well as the significant differences in the respective analyses. Equations of arbitrary order are studied, followed by a detailed analysis for equations of first and second order. Equations with polynomial coefficients are considered and explicit solutions for equations with linear coefficients are given, showing significant differences in the functional form of solutions of differential equations from those of difference equations. An alternative method of solution involving transformation of both the dependent and independent variables is given for both differential and difference equations. A comprehensive, detailed treatment of Green’s functions and the associated initial and boundary conditions is presented for differential and difference equations of both arbitrary and second order. A dictionary of difference equations with polynomial coefficients provides a unique compilation of second order difference equations obeyed by the special functions of mathematical physics. Appendices augmenting the text include, in particular, a proof of Cramer’s rule, a detailed consideration of the role of the superposition principal in the Green’s function, and a derivation of the inverse of Laplace transforms and generating functions of particular use in the solution of second order linear differential and difference equations with linear coefficients.