Triangular Orthogonal Functions for the Analysis of Continuous Time Systems

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Description

This book deals with a new set of triangular orthogonal functions, which evolved from the set of well known block pulse functions (BPF), a major member of the piecewise constant orthogonal function family (PCOF).

This book deals with a new set of triangular orthogonal functions, which evolved from the set of well known block pulse functions (BPF), a major member of the piecewise constant orthogonal function family (PCOF). Unlike PCOF, providing staircase solutions, this new set of triangular functions provides piecewise linear solution with less mean integral squared error (MISE).

After introducing the rich background of the PCOF family, which includes Walsh, block pulse and other related functions, fundamentals of the newly proposed set – such as basic properties, function approximation, integral operational metrics, etc. – are presented. This set has been used for integration of functions, analysis and synthesis of dynamic systems and solution of integral equations. The study ends with microprocessor based simulation of SISO control systems using sample-and-hold functions and Dirac delta functions.

Readership: This book is a source of new knowledge to researchers and academicians in the area of mathematics as well as systems and control.

Contents

Preface; 1: Walsh, Block Pulse, and Related Orthogonal Functions in Systems and Control; 2: A Newly Proposed Triangular Function Set and Its Properties; 3: Function Approximation via Triangular Function Sets and Operational Matrices in Triangular Function Domain; 4: Analysis of Dynamic Systems via State Space Approach; 5: Convolution Process in Triangular Function Domain and Its Use in SISO Control System Analysis; 6: Identification of SISO Control Systems via State Space Approach; 7: Solution of Integral Equations via Triangular Functions; 8: Microprocessor Based Simulation of Control Systems Using Orthogonal Functions; Index

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