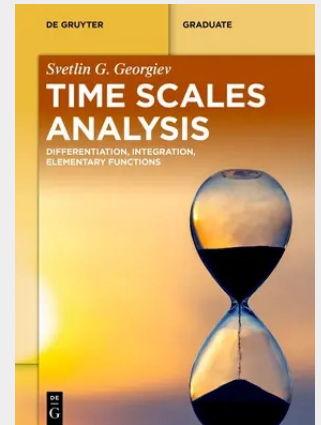


Time Scales Analysis

Differentiation, Integration, Elementary Functions

In Chapter 1, time scales are defined and some examples are given. Forward jump operators, backward jump operators, forward graininess functions and backward graininess functions are defined and some of their properties are given. The induction principle and dual induction principle are introduced. Chapter 2 deals with the delta differential calculus for one variable functions on time scales. The basic definition of delta differentiation is due to Hilger. We have included several examples on delta differentiation and the delta Leibniz formula for the n th delta derivative of a product of two functions. Nabla derivatives are introduced. We present delta mean value results. They are given sufficient conditions for delta convexity and delta concavity of one variable functions. It is stated a sufficient condition for completely delta differentiability of one variable function. Several versions of delta chain rules and delta L'Hôpital's rules, which do not appear in the usual form, are included. In Chapter 3 are introduced the main concepts for regulated, delta rd-continuous and delta pre-differentiable functions. They are defined indefinite delta integral and the Riemann delta integral and they are deduced some of their properties. The basic delta monomials are defined and investigated. In the chapter are represented different variants of Taylor's formula. Improper integrals of the first and the second kind are defined and some of their properties are deduced. A survey on nabla integrals is done. Chapter 4 is devoted to the Hilger complex plane and the basic operations circle plus and circle minus. They are defined the basic delta elementary functions: delta exponential function, delta trigonometric functions and delta hyperbolic functions. Some of their properties are deduced.



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