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Some properties of nabla Laplace transform on isolated time scales

This talk introduces new properties of the bilateral and unilateral nabla Laplace transform defined on isolated time scales. The nabla Laplace transform can be seen as a generalization of the classical Laplace transform, extending its applicability to systems that exhibit both continuous and discrete behavior within the framework of time scale calculus. We present the formal definitions of the direct and inverse nabla Laplace transforms and prove that they are true inverses of each other. The proposed formulation recovers the well-known Z-transform as a special case and ensures that the corresponding Hilger circles lie in the right half-plane, satisfying the expected analytical properties. Using tools from real and complex analysis, we derive nabla Laplace transforms for several fundamental functions and verify the results through illustrative examples. The study highlights the potential of the nabla Laplace transform as an effective tool for solving dynamic equations defined on arbitrary isolated time scales.

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