

Convex Functions on Discrete Time Domains

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Abstract. In this paper, we introduce the definition of a convex real valued function f defined on the set of integers, \mathbb{Z} . We prove that f is convex on \mathbb{Z} if and only if $\Delta^2 f \geq 0$ on \mathbb{Z} . As a first application of this new concept, we state and prove discrete Hermite-Hadamard inequality using the basics of discrete calculus (i.e. the calculus on \mathbb{Z}). Second, we state and prove the discrete fractional Hermite-Hadamard inequality using the basics of discrete fractional calculus. We close the paper by defining the convexity of a real valued function on any time scale.