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Strongly $\mathcal{E}$-Convexity on Interval-Valued Functions

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Abstract

This article presents some novel categories of convex functions: the strongly LU-$\mathcal{E}$ convex function and the pseudo strongly LU-$\mathcal{E}$ convex function. These functions are defined within the framework of strongly $\mathcal{E}$ convex sets. To illustrate the significance of these definitions, we provide several non-trivial examples that demonstrate the existence of such functions in mathematical analysis. Furthermore, we explore and discuss a variety of interesting and fundamental properties associated with these functions. These include characterizations that distinguish them from other convex functions and relationships that link them to other mathematical constructs. Additionally, we delve into a nonlinear programming problem where the objective function is a quasi strongly LU-$\mathcal{E}$ convex function, offering insights into how these new function classes can be applied in optimization theory. This work expands the theoretical understanding of convexity and its applications in mathematical programming.

Keywords: Quasi strongly $\mathcal{E}$-convex function, strongly $\mathcal{E}$-convex set, interval-valued functions, LU ordering, pseudo strongly LU-$\mathcal{E}$-convex function.