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NEW OSTROWSKI TYPE INEQUALITIES FOR m-CONVEX FUNCTIONS AND APPLICATIONS

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Abstract

In this paper we establish new inequalities of Ostrowski type, for functions whose derivatives in absolute value are m-convex. We also give some applications to special means of positive real numbers. Finally, we obtain some error estimates for the midpoint formula.

Keywords: m-convex function, Starshaped function, Convex function, Ostrowski inequality, Hermite-Hadamard inequality, Hölder inequality, Power Mean inequality, Special means, The midpoint formula, Lipschitzian mapping.

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1. Introduction

Let $f : I \subset [0, \infty) \to \mathbb{R}$ be a differentiable mapping on I°, the interior of the interval I, such that $f' \in L([a, b])$ where $a, b \in I$ with $a < b$. If $|f'(x)| \leq M$, then the following inequality holds (see [2]):

$$\left| f(x) - \frac{1}{b-a} \int_a^b f(u)du \right| \leq \frac{M}{b-a} \left[\frac{(x-a)^2 + (b-x)^2}{2} \right].$$

This inequality is well known in the literature as the *Ostrowski inequality*. For some results which generalize, improve, and extend the above inequality, see [2, 5, 6, 8, 10], and references therein.

In [14], G. Toader defined m-convexity, an intermediate between usual convexity and the starshaped property, as the following:

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