ON SOME INEQUALITIES OF SIMPSON'S TYPE VIA $h-$CONVEX FUNCTIONS

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Abstract

In this paper, we prove some new inequalities of Simpson's type for functions whose derivatives of absolute values are $h-$convex and $h-$concave functions. Some new estimations are obtained. Also we give some sophisticated results for some different kinds of convex functions.

Keywords: $h-$convex and $h-$concave functions, Simpson's Inequality, Hölder Inequality.

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1. Introduction

The following inequality is well known in the literature as Simpson's inequality;

$$(1.1) \quad \frac{1}{b-a} \int_a^b f(x)\, dx - \frac{1}{3}\left[\frac{f(a)+f(b)}{2} + 2f\left(\frac{a+b}{2}\right) \right] \leq \frac{1}{2880} \left\| f^{(4)} \right\|_\infty (b-a)^4 ,$$

where the mapping $f : [a,b] \to \mathbb{R}$ is assumed to be four times continuously differentiable on the interval and $f^{(4)}$ to be bounded on (a,b) , that is,

$$\left\| f^{(4)} \right\|_\infty = \sup_{t \in (a,b)} \left| f^{(4)}(t) \right| < \infty.$$

For some results which generalize, improve and extend the inequality (1.1) see the papers [1]-[3].

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