Hacettepe Journal of Mathematics and Statistics
Volume 42 (4) (2013), 309 – 317

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

MEVLÜT TUNÇ *, ÇETİN YILDIZ† and ALPER EKİNCİ‡

Received 06 : 06 : 2012 : Accepted 1 : 10 : 2012

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.

2000 AMS Classification: 26D15, 26D10

1. Introduction

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

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

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].

*Kilis 7 Aralık University, Faculty of Science and Arts, Department of Mathematics, 79000, Kilis, Turkey. E-Mail: mevluttunc@kilis.edu.tr
Corresponding author.

†Atatürk University, K.K. Education Faculty, Department of Mathematics, 25240, Erzurum, Turkey. E-Mail: yildizc@atauni.edu.tr

‡Ağrı İbrahim Çeçen University, Faculty of Science and Letters, Department of Mathematics, 04100, Ağrı, Turkey. E-Mail: alperekinci@hotmail.com