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A note on Feng Qi type inequality for pseudo-integral

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Abstract

We present a Feng Qi type inequality for the generalized Sugeno integral and a much wider class of functions than the comonotone functions. There are considered two cases of the real semiring with pseudo-operations: one, when pseudo-operations are dened by monotone and continuous function g, the second semiring $([a, b], \sup, \odot)$, where $\odot$ is generated and the third semiring where both pseudo-operations are idempotent, i.e., $\oplus = sup$ and$\odot = inf$.

Keywords: Hlders inequality Feng Qi inequality, Semiring, Pseudo-addition, Pseudo-multiplication, Pseudo-integral
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1 Introduction

Pseudo-analysis is a generalization of the classical analysis, where instead of the eld of real numbers a semiring is dened on a real interval $[a, b] \subset [-1, 1]$ with pseudo-addition $\oplus$ and with pseudo-multiplication $\odot$, see [7, 9]. Based on this structure there were developed the concepts of $\oplus$-measure (pseudo-additive measure), pseudo-integral, pseudo-convolution, pseudo-Laplace transform, etc. The advantages of the pseudo-analysis are that there are covered with one theory, and so with unied methods, problems (usually nonlinear and under uncertainty) from many different elds (system theory, optimization, decision making, control theory, differential equations, difference equations, etc.). Pseudo-analysis uses many mathematical tools from different elds as functional equations, variational calculus, measure theory, functional analysis, optimization theory, semiring theory, etc.
The integral inequalities are good mathematical tools both in theory and application. Different integral inequalities including Chebyshev, Jensen, Holder and Minkowski inequalities are widely used in various fields of mathematics, such as probability theory, differential equations, decision-making under risk and information sciences.
The In this paper, we use Pseudo-analysis for the generalization of the classical analysis, where instead of the field of the numbers a semiring is defined on a real interval $[a, b] \to [1, 1]$ with pseudo-addition $\oplus$ and with pseudo-multiplication $\odot$. Thus it would be an interesting topic to generalize an inequality from the classical analysis as special

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