



Abstract Convexity of ICR- k Functions

Mohammad Hossein Daryaei*

Shahid Bahonar University of Kerman, Kerman, Iran.

Abstract

The theory of ICR (increasing and co-radiant) functions defined on ordered topological vector spaces has well been developed. In this paper, we present the theory of ICR- k (increasing and co-radiant of degree k) functions defined on an ordered topological vector space X . We first give a characterization for ICR- k functions and examine abstract convexity of this class of functions. Finally, we characterize support set and subdifferential of ICR- k functions.

Keywords: Abstract convexity, ICR function, ICR- k function, Subdifferential, Support set.

Mathematics Subject Classification [2010]: 26B25, 26A48

1 Introduction

Monotonic analysis is one of the advanced topics in so-called abstract convex analysis which is a natural generalization of classical convex analysis.

Abstract convexity has found many applications in the study of mathematical analysis and optimization problems (see [2, 5]). Functions which can be represented as upper envelopes of subsets of a set H of sufficiently simple (*elementary*) functions, are studied in this theory (for more details see [4, 5, 6]).

It is well-known that some classes of increasing functions are abstract convex. For example, the class of increasing and positively homogeneous (IPH) functions (see [5]) and the class of increasing and convex-along-rays (ICAR) functions are abstract convex (see [4]). The class of increasing and co-radiant (ICR) functions is another class of increasing functions which are abstract convex.

Abstract convexity of ICR functions defined on a topological vector space has been investigated in [1, 3]. In this paper, we study non-negative increasing and co-radiant of degree k (ICR- k) functions defined on an ordered topological vector space X . Finally, we characterize the support set and subdifferential of this functions.

2 Preliminaries

Let X be a topological vector space. We assume that X is equipped with a closed convex pointed cone S (the latter means that $S \cap (-S) = \{0\}$). The increasing property of our

*Speaker