

Existence Results for Cone Saddle Points by Using Vector Variational-like Inequalities

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Abstract

This paper is concerned with existence theorems for cone saddle-points of vector-valued functions. By means of vector variational-like inequalities, we first characterize a vector-valued saddle-point problem, and then obtain the existence result for cone invex and Fréchet differentiable vector-valued functions. In Section 1, we introduce historical background on this field and our motivation for this study briefly. In Section 2, we introduce formulations of vector-valued saddle-point problem and vector variational-like inequality problem. Next, we introduce some elementary concepts related to our results. In Section 3, we show a relationship between a vector-valued saddle-point problem and a vector variational-like inequality problem, and we prove an existence result of a vector-valued saddle-point problem.

1 Introduction

Studies on vector-valued minimax theorems or vector-valued saddle-point problems have been extended widely; see [12] and references cited therein. Existence results for cone saddle-points are based on some fixed point theorems or scalar minimax theorems; see [10, 11]. Recently, this kind of problems has been solved by a different approach in [7], in which the equivalence to a vector variational inequality problem has been established, and then an existence theorem for weak saddle-points of a vector-valued function is shown by using this property. However, the setting of their

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