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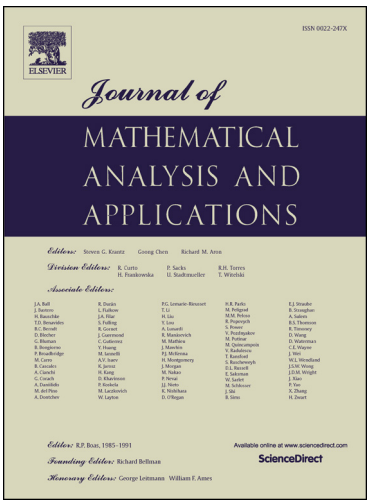

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On the equivalence of the Choquet, pan- and concave integrals on finite spaces

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Abstract

In this paper we introduce the concept of *maximal cluster of minimal atoms* on monotone measure spaces and by means of this new concept we continue to investigate the relation between the Choquet integral and the pan-integral on finite spaces. It is proved that the (M)*-property* of a monotone measure is a sufficient condition that the Choquet integral coincides with the pan-integral based on the usual addition $+$ and multiplication $\cdot$. Thus, combining our recent results, we provide a necessary and sufficient condition that the Choquet integral is equivalent to the pan-integral on finite spaces. Meanwhile, we also use the characteristics of minimal atoms of monotone measure to present another necessary and sufficient condition that these two kinds of integrals are equivalent on finite spaces. The relationships among the Choquet integral, the pan-integral and the concave integral are summarized.

Keywords: Monotone measure; Choquet integral; Pan-integral; Concave integral; Minimal atom; Maximal cluster of minimal atoms; (M)-property

1. Introduction

In nonlinear integral theory, related to the standard arithmetical operations on reals, there are three kinds of important integrals, the Choquet integral [3], the pan-integral [25] and the concave integral [7, 8]. It is well known that all the three types of integrals are particular generalizations

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