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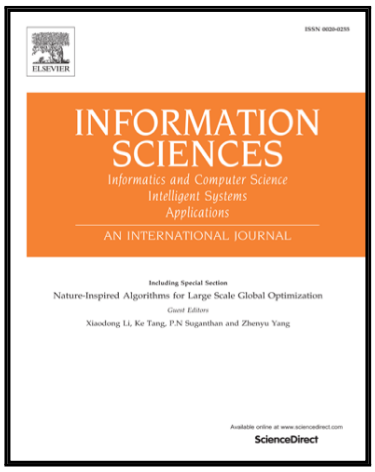

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PII: S0020-0255(17)31150-7
DOI: 10.1016/j.ins.2017.12.029
Reference: INS 13323

To appear in: *Information Sciences*

Received date: 28 April 2017
Revised date: 29 September 2017
Accepted date: 23 December 2017

Please cite this article as: Giancarlo Lucca, José Antonio Sanz, Graçaliz Pereira Dimuro, Benjamín Bedregal, Humberto Bustince, Radko Mesiar, C_F-Integrals: a new family of pre-aggregation functions with application to fuzzy rule-based classification systems, *Information Sciences* (2017), doi: 10.1016/j.ins.2017.12.029

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ACCEPTED MANUSCRIPT

C_F-Integrals: a new family of pre-aggregation functions with application to fuzzy rule-based classification systems

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Abstract

This paper introduces the family of C_F-integrals, which are pre-aggregations functions that generalizes the Choquet integral considering a bivariate function F that is left 0-absorbent. We show that C_F-integrals are 1-pre-aggregation functions, studying in which conditions they are idempotent and/or averaging functions. This characterization is an important issue of our approach, since we apply these functions in the Fuzzy Reasoning Method (FRM) of a fuzzy rule-based classification system and, in the literature, it is possible to observe that non-averaging aggregation functions usually provide better results. We carry out a study with several subfamilies of C_F-integrals having averaging or non-averaging characteristics. As expected, the proposed non-averaging C_F-integrals obtain more accurate results than the averaging ones, thus, offering new possibilities for aggregating accurately the information in the FRM. Furthermore, it allows us to enhance the results of classical FRMs like the winning rule and the additive combination.

Keywords: C_F-integral, Choquet Integral, pre-aggregation function, classification problems, fuzzy reasoning method, fuzzy rule-based classification systems

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