

The problem of random generation of non-additive measures[†]

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SUMMARY

Non-additive measures are a generalization of classical probability measures in which additivity is removed and monotonicity is imposed instead. They have become an important tool in many different fields, as Decision Theory, Combinatorics, and so on (see [1] for a review on fuzzy measures).

An interesting problem arising in the practical use of non-additive measures is the problem of identification of the non-additive measure modeling a concrete situation. Many different algorithms have been proposed in order to cope with this problem. In order to study whether a procedure works properly, we need to generate non-additive measures in a random way. This is the problem that we treat in this paper.

The problem of generating in a uniform way points in a polytope is in general a complex problem. In the case of non-additive measures, we will use the particular structure of this polytope. First, we will use the fact that it is an order polytope, so the problem can be stated in terms of the subjacent poset, and it can be proved that the problem reduces to generate randomly a linear extension in the poset. Another possibility is to use the symmetrical structure of the subjacent poset.

Keywords: Non-additive measure, order polytope, random generation, linear extension.

AMS Classification: 28E10, 52B11, 65Y20.

References

- [1] M. GRABISCH AND T. MUROFUSHI AND M. SUGENO (2000). *Fuzzy Measures and Integrals- Theory and Applications*, Physica-Verlag.

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