Similarity of random sets based on approximations by convex compact sets and envelope tests

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Abstract

The contribution presents a method of comparing two random sets given just one realisation of each of them. The method is described in more details in [1]. It is based on a heuristic that we compare inner structures of the realisations. First, we approximate each realisation by a union of convex compact sets. Then, we sample a suitable number of the approximating convex compact sets and evaluate their support functions. Finally, we compare two obtained groups of the support functions by testing the equality of their distributions using envelope test introduced in [2]. The p-value of the test play the role of a similarity measure of the random sets, so it can be used to distinguish between two realisations of random sets, more precisely to decide whether two given realisations come from the same underlying process. The suggested procedure is illustrated on a simulation study of common random sets like Boolean model and Quermass-interaction processes with different parameters, and applied to real data.

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References

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