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Abstract

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A generalization of Ripley's K-function for space curves

Joint with Rasmus Waagepetersen and Stefan Sommer

The first- and second-moment structure of spatial point sets can be characterized by the intensity function and Ripley's K-function. Given a set of points, the homogeneous K-function can be estimated from the matrix of all pair-wise distance of the points, also known as the distance matrix. This inspires us to consider the K-function as a description of distance matrices in general, which implies that for any set of objects and distance functions between them, we can compute the set's distance matrix, and hence we can compute a K-function. In this work, we consider sets of space curves and some curve-distance and semi-distance functions, we compute K-functions from their distance matrices, we empirically investigate the resulting K-functions for their ability to characterize sets of curves that cluster in various ways, and we compare with an existing method from the literature presented in Chiu et al. 2013.