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Abstract

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# Testing goodness of fit for point processes via topological data analysis

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In this talk, we present a central limit theorem for the persistence diagram associated with a 2D point process when the observation window becomes increasingly large. In order to apply general convergence results, a bounded version of persistent Betti numbers is introduced. The persistence diagram is shown to converge to a Gaussian process under suitable conditions on the point process.

The results are used to derive asymptotically normal test statistics to asses goodness of fit for point patterns. The power of these tests is investigated on simulated point patterns and we apply the tests to a real data set.