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Joannes Krebs -On the law of the iterated logarithm and Bahadur representation in stochastic geometry

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We study the law of the iterated logarithm and a related strong invariance principle for certain functionals in stochastic geometry. The underlying point process is either a homogeneous Poisson process or a binomial process.

Moreover, requiring the functional to be a sum of so-called stabilizing score functionals enables us to derive a Bahadur representation for sample quantiles. The scores are obtained from a homogeneous Poisson process. We also study local fluctuations of the corresponding empirical distribution function and apply the results to trimmed and Winsorized means of the scores.

As potential applications, we think of well-known functionals defined on the k -nearest neighbors graph and important functionals in topological data analysis such as the Euler characteristic and persistent Betti numbers as well as statistics defined on Poisson-Voronoi tessellations.