COMPONENT COUNTS IN THE RANDOM CONNECTION MODEL

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The random connection model is a spatial random graph, whose vertices are the points of a stationary Poisson point process in Euclidean space. Each pair of distinct vertices \( x, y \) is independently connected by an edge with a probability depending on the relative position of \( x \) and \( y \) (for example, their distance). This model generalizes the random geometric graph, where the probability for drawing an edge is one if the distance does not exceed a given threshold and zero otherwise. In this talk, the number of components of the random connection model which are isomorphic to a given finite connected graph and belong to a compact convex observation window as well as the total number of components within the observation window are considered. For increasing observation windows, variance asymptotics and central limit theorems are shown. The proofs rest upon new bounds for the normal approximation of functionals of pairwise marked Poisson point processes, which are derived via the Malliavin–Stein method and might be of independent interest.

This is based on joint work with Günter Last und Franz Nestmann (both from Karlsruhe).