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Point Process Regularity

We are interested by the repulsion phenomenon in stationary point processes. By repulsion we mean that the points tend to repel each others.

Usually, repulsive Gibbs point processes or Hard Core point processes are used to model repulsivness.

However, an interesting alternative class is the family of determinantal point processes (DPP). DPP are known in probability since the sixties but they have only arised recently in the field of statistics.

DPP are of particular interest because they have many appealing properties: they can be simulated perfectly and easily, all theirs moments are explicitly known and their density of probability (with respect to the Poisson process) admits a closed form expression on any compact set.

 We introduce different criteria to quantify repulsion, based on the second order moment of the point process, specifically its pair correlation function.

 According to these criteria, we investigate how repulsive a stationary DPP can be. This allows us to evaluate the possible range of applications of DPP in comparison with Gibbs or hardcore models.