On dimension reduction of covariates in stochastic geometry models

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Dimension reduction of multivariate data as studied by Li (1991) has been developed by Guan and Wang (2010) to the case of spatial point processes with multivariate Gaussian random field as covariates. We generalize these results in three ways. Firstly the class of models is extended to random sets in d-dimensional Euclidean space with dimension smaller than d, such as fibre and surface systems or random tessellations. In inverse regression models for the dimension reduction we suggest slicing based on geometrical marks of the random set. Finally in a refined model for the dimension reduction using moment measures also the second-order central subspace is investigated. Numerical results based on simulations demonstrate the models and statistical analyses. The lecture comes from a joint work with authors of a forthcoming paper Sedivy et al (2013).

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