

# LIKELIHOOD ESTIMATION OF SOFT-CORE INTERACTION POTENTIALS FOR GIBBSIAN POINT PATTERNS

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**Abstract.** The likelihood method is developed for the analysis of so-called regular point patterns. Approximating the normalizing factor of Gibbs canonical distribution, we simultaneously estimate two parameters, one for the scale and the other which measures the softness (or hardness), of repulsive interactions between points. The approximations are useful up to a considerably high density. Some real data are analyzed to illustrate the utility of the parameters for characterizing the regular point pattern.

*Key words and phrases:* Gibbs canonical distribution, Hard-Core model, Monte Carlo method,  $\psi$ -value, reduced density, Soft-Core model, spline surface fitting.