

The main theme of this thesis is the theory of stationary point processes, in particular the directional K-function. In the first chapter we explain the essentials of planar point process theory including the classical definition of K-function and its estimator. The second chapter introduces two types of the directional K-function: cylindrical K-function whose structural element is a cylinder and directional K-function using double spherical cones. The third chapter presents the comparison of directional K-function and its estimator on an anisotropic version of Thomas process. We also illustrate the major contribution of directional K-function in orientation analysis of point patterns. We introduce a heuristic method for detecting anisotropies in clustered or regular data.