

In this work we present an introduction to the theory of point processes in space and time with focus on space--time shot--noise Cox process. Further from theoretical point of view we study its simulation, space--time separability, kernel estimate of intensity function and non--parametric estimation of some summary statistics using edge corrections. For two ambit models and one space--time separable model we do numerical calculations using the presented theory and software Wolfram Mathematica 9.0. For these three models we do simulations, we select the best bandwidth for kernel estimate of the intensity function and we also calculate some theoretical summary statistics including the pair correlation function.