



Poisson source localization on the plane: change-point case

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Abstract

We present a detection problem where several spatially distributed sensors observe Poisson signals emitted from a single radioactive source of unknown position. The measurements at each sensor are modeled by independent inhomogeneous Poisson processes. A method based on Bayesian change-point estimation is proposed to identify the location of the source's coordinates. The asymptotic behavior of the Bayesian estimator is studied. In particular, the consistency and the asymptotic efficiency of the estimator are analyzed. The limit distribution and the convergence of the moments are also described. The similar statistical model could be used in GPS localization problems.

Keywords Inhomogeneous Poisson process · Change-point problem · Bayesian estimator · Likelihood ratio process · Radioactive source · Sensors · GPS localization

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