

ESTIMATION OF SINGULARITY LOCATION FOR POISSON PROCESS

Sergueï DACHIAN

*Laboratoire de Mathématiques Appliquées
Université Blaise Pascal (Clermont-Ferrand 2)
63177 Aubière CEDEX, FRANCE
e-mail: Serguei.Dachian@math.univ-bpclermont.fr*

Let X be an inhomogeneous Poisson process on some fixed interval. The intensity function of X is supposed to be strictly positive and regular on this interval except at the point θ , in which it has a singularity. The three following types of singularities are considered: 0-type singularities, ∞ -type singularities and cusps. Here we say that a function $f(t)$ has 0-type singularity in θ if in the vicinity of θ it tends to 0 like $|t - \theta|^p$, $p \in (0,1)$; an ∞ -type singularity if it tends to ∞ like $|t - \theta|^p$, $p \in (-1,0)$ and a cusp if it tends to some positive constant c like $c + |t - \theta|^p$, $p \in (0,1/2)$. We suppose that we know the shape of the intensity function, but not the location of the singularity. We consider the problem of estimation of this location parameter θ based on n independent observations of the process X . We study the Bayesian estimators and, in the cases $p > 0$, the maximum likelihood estimator. We show that these estimators are consistent, their rate of convergence is $n^{1/(p+1)}$ for 0-type and ∞ -type singularities, and $n^{1/(2p+1)}$ for cusps. We equally find the limiting distributions of the estimators, and show that the Bayesian estimators are asymptotically efficient. Finally, we present some computer simulations.

References

- [1] Dachian, S. (2001). Estimation of Cusp Location by Poisson Observations, to appear in *Statistical Inference for Stochastic Processes*.
- [2] Dachian, S. (2002). Estimation of Singularity Location by Poisson Observations, in preparation.

[Back to the Workshop's Program](#)