

I -divergence based statistical inference in exponential family

Vladimíra Sečkárová^{*1,2} and Radka Sabolová^{†1}

¹MFF UK, KPMS, Sokolovská 83, CZ – 186 75 Praha 8

²ÚTIA AV ČR, v.v.i., Pod Vodárenskou věží 4, Praha 8

The I -divergence [2] represents a tool for statistical inference about an unknown parameter γ of a probability distribution satisfying the following conditions: (i) it belongs to the regular exponential family and (ii) possesses the covering property [1]. We exploit the use of the I -divergence from two different views. Firstly, we propose a graphical method for I -divergence based testing of parameter γ exploiting the cumulative distribution function, quantiles of the I -divergence and quantiles of the uniform distribution. The description is followed by the application to simulated exponentially distributed data. Secondly, we discuss the decomposition of the I -divergence into two independent elements, both having statistical interpretation in hypothesis testing. The aim of this part is to show the decompositions for several members of the exponential family, namely the exponential, gamma and Pareto distribution.

Acknowledgement

The authors have been partially supported by the Aktion grant Austria-Czech Republic and by the grant SVV-2013 - 267 315.

Literature

- [1] Pázman, A. (1993): *Nonlinear statistical Models*. Kluwer Acad. Publ., Dordrecht, chapters 9.1 and 9.2.
- [2] Stehlík, M. (2003): Distributions of exact tests in the exponential family. *Metrika* **57** 145–164.

*seckarov@karlin.mff.cuni.cz

†sabolova@karlin.mff.cuni.cz