Meeting: 1005, Newark, Delaware, SS 6A, Special Session on High Dimensional Probability

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Location and scale functionals based on t distributions.

For laws on the real line, joint maximum likelihood estimation of location μ and scale σ for the t distribution with ν degrees of freedom for $1 < \nu < \infty$ extends uniquely from empirical measures concentrated in n distinct points, $n \geq 2$, to a weakly continuous functional (μ_ν, σ_ν) defined on all laws. On the set of laws whose largest atom is of size $< \nu/(\nu+1)$, or equivalently $\sigma_\nu > 0$, the functional is Fréchet C^∞ with respect to the dual-bounded-Lipschitz norm. Other norms, adapted to just the functions needed, give in addition locally uniform Donsker properties. Surprisingly, for any ν, there are laws concentrated in three points for which μ_ν is at an arbitrarily extreme quantile. Uniformly over all laws, for $0 < \gamma < 1/(\nu+1)$, if $\mu_\nu(P)$ is not in J for an interval J with $P(J) \geq 1-\gamma$, μ_ν must be within $\delta(\gamma)\lambda(J)$ of J, where $\lambda =$ length and $\delta(\gamma) \to 0$ as $\gamma \to 0$. (Received February 03, 2005)