

Statistics 592, Problem Set 3

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Reading: BKRW Chapter 3, Section 4; Chapter 5, Sections 5.3 and 5.4.

Due: Thursday, February 4, 1998.

1. Suppose that \mathcal{P} is the collection of all distributions P on R with $E_P|X|^{2+\delta} \leq M$, positive density p with respect to Lebesgue measure in a neighborhood of the median $\text{med}(P)$, and known mean $E_P(X)$; without loss of generality, suppose that $E_P(X) = 0$. Find an information bound for estimation of $\nu(P) = \text{med}(P)$.
2. Suppose that \mathcal{P} is the exponential frailty (mixture) model with density

$$p(x; \theta, G) = \int_0^\infty z^2 \theta \exp(-z(x_1 + \theta x_2)) dG(z)$$

where $\theta \in (0, \infty)$ and G is a distribution on $(0, \infty)$.

A. Compute the score \dot{l}_θ for θ and score operator \dot{l}_g for G (assuming that G has density g with respect to μ). How are you using Proposition A.5.5 to do this?

B. Compute the adjoint \dot{l}_g^T of \dot{l}_g and the information operator $\dot{l}_g^T \dot{l}_g$. What is $\dot{\mathcal{P}}_2$ for this model?