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Confidence regions in Cox proportional hazards model with measurement errors

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Cox proportional hazards model with measurement errors in covariates is considered. It is the ubiquitous technique in biomedical data analysis. In Kukush et al. (2011) [Journal of Statistical Research **45**, 77-94] and Chimisov and Kukush (2014) [Modern Stochastics: Theory and Applications **1**, 13-32] asymptotic properties of a simultaneous estimator $(\lambda_n; \beta_n)$ for the baseline hazard rate $\lambda(\cdot)$ and the regression parameter β were studied, at that the parameter set $\Theta = \Theta_\lambda \times \Theta_\beta$ was assumed bounded.

In Kukush and Chernova (2017) [Theory of Probability and Mathematical Statistics **96**, 100-109] we dealt with the simultaneous estimator $(\lambda_n; \beta_n)$ in the case, where the Θ_λ was unbounded from above and not separated away from 0. The estimator was constructed in two steps: first we derived a strongly consistent estimator and then modified it to provide its asymptotic normality.

In this talk, we construct the confidence interval for an integral functional of $\lambda(\cdot)$ and the confidence region for β. We reach our goal in each of the three cases: (a) the measurement error is bounded, (b) it is normally distributed, or (c) it is a shifted Poisson random variable. The censor is assumed to have a continuous pdf. In future research we intend to elaborate a method for heavy tailed error distributions.

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