

Minimax theory of nonparametric hazard rate estimation: efficiency and adaptation

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Abstract The problem of nonparametric estimation of the hazard rate function is considered and the theory of sharp minimax estimation for two global and two local Sobolev classes is developed. Several interesting outcomes are as follows: (i) Classical global and local function classes imply different sharp constants of the MISE convergence. This is in contrary to the density estimation where sharp constants are the same. (ii) Two global classes imply different sharp constants and correspondingly require using different linear estimates. (iii) Two local classes imply the same sharp constant, and nonetheless require different linear estimates to attain this constant. (iv) A sharp-minimax data-driven estimator is proposed that adapts to the smoothness of the hazard rate and to an unknown underlying function class, and it is tested for small samples via a numerical study.

Keywords Asymptotic · Coefficient of difficulty · Global and local minimax · MISE · Small sample