SPATIALLY ADAPTIVE LOCAL LIKELIHOOD APPROXIMATIONS FOR INVERSE IMAGING

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The maximum likelihood technique allows dealing with quite general statistical models of signal dependent observations. Being localized and combined with the local polynomial approximation (LPA) of the signal this technique relaxes the standard parametric modelling assumptions and results in flexible nonparametric regression estimation. We address to the anisotropy of the signal using multi-directional (sectorial) approximations. The data-driven sizes of the sectorial windows, obtained by the intersection of confidence interval (ICI) algorithm, allow forming star-shaped adaptive neighborhoods used for the point-wise estimation. We consider indirect Poissonian image observations modeled by shift-invariant convolution operators. The spatially adaptive deconvolution is based on regularized inverse and Wiener inverse estimators. Fast adaptive algorithm implementation is developed for the zero-order and zero-first-order LPA. Simulation experiments and comparison with the best results in the field demonstrates an advance performance of the developed algorithms.