

Penalised Maximum Likelihood Deconvolution

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Abstract

Deconvolution is the problem of estimating the distribution of a quantity from a sample with additive measurement error. There are two main approaches to deconvolution - Fourier analysis based approaches, and penalised likelihood with a smoothness penalty. While Fourier-based methods are mathematically elegant, they can be unstable and perform poorly on real data, particularly when signal-noise ratio or sample size are low. Most existing penalised likelihood methods involve restricting the possible space of distributions to a semiparametric family. In this talk, I will present a new approach to the penalised likelihood method, where by changing the basis functions, we are able to reduce the penalised likelihood problem to one of constrained optimisation. We show that this method outperforms existing methods in a large number of scenarios.