Robust Regression for Mixed Poisson–Gaussian Model

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In this talk we describe efficient computational approaches to compute approximate solutions of a linear inverse problem that is contaminated with mixed Poisson-Gaussian noise, and when there are additional outliers in the measured data. The Poisson-Gaussian noise leads to a weighted minimization problem, with solution-dependent weights. To address outliers, the standard least squares fit-to-data metric is replaced by the Talwar robust regression function. Convexity, regularization parameter selection schemes, and incorporation of non-negative constraints are investigated. A projected Newton algorithm is used to solve the resulting constrained optimization problem, and a preconditioner is proposed to accelerate conjugate gradient Hessian solves.

This is joint work with Marie Kubinova.

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