

Space alternating penalized Kullback proximal point algorithms for maximizing likelihood with nondifferentiable penalty

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Received: 21 August 2008 / Revised: 13 January 2011 / Published online: 11 August 2011
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Abstract The EM algorithm is a widely used methodology for penalized likelihood estimation. Provable monotonicity and convergence are the hallmarks of the EM algorithm and these properties are well established for smooth likelihood and smooth penalty functions. However, many relaxed versions of variable selection penalties are not smooth. In this paper, we introduce a new class of space alternating penalized Kullback proximal extensions of the EM algorithm for nonsmooth likelihood inference. We show that the cluster points of the new method are stationary points even when they lie on the boundary of the parameter set. We illustrate the new class of algorithms for the problems of model selection for finite mixtures of regression and of sparse image reconstruction.

Keywords EM algorithm · Maximum likelihood estimation · Sparsity · Model selection · Space alternating algorithm · Nonsmooth penalty