High-Dimensional Model Selection via Chebyshev's Greedy Algorithm

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Abstract

In this talk, we investigate the convergence rate of Chebyshev's greedy algorithm (CGA) for regression models when the true coefficient vector satisfies a general weak sparsity condition. We determine the iteration number of CGA using our developed data-driven approach and demonstrate that the optimal convergence rate can be achieved without prior knowledge of the degree of sparsity. Our convergence theory relies on the convexity and the smoothness of the population loss function, allowing for the analysis of a broad family of regression models and providing optimality guarantees under weak assumptions. As a specific example, we apply our method to generalized linear models (GLM) and composite quantile regression (CQR) models, and offer the sufficient conditions under which the optimal rate can be achieved.