



Multivariate Regression with Calibration

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We propose a new method named calibrated multivariate regression (CMR) for fitting high dimensional multivariate regression models. Compared to existing methods, CMR calibrates the regularization for each regression task with respect to its noise level so that it is simultaneously tuning insensitive and achieves an improved finite sample performance. Computationally, we develop an efficient smoothed proximal gradient algorithm with a worst-case numerical rate of convergence $\mathcal{O}(1/\epsilon)$, where ϵ is a pre-specified accuracy. Theoretically, we prove that CMR achieves the optimal rate of convergence in parameter estimation. We illustrate the usefulness of CMR by thorough numerical simulations and show that CMR consistently outperforms existing multivariate regression methods. We also apply CMR on a brain activity prediction problem and find that CMR even outperforms the handcrafted models created by human experts.

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