

Sampled Limited Memory Methods for Least Squares Problems with Massive Data

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October 17, 2019

In this talk, we discuss massive least squares problems where the size of the forward model matrix exceeds the storage capabilities of computer memory or the data is simply not available all at once. We consider randomized row-action methods that can be used to approximate the solution. We introduce a sampled limited memory row-action method for least squares problems, where an approximation of the global curvature of the underlying least squares problem is used to speed up the initial convergence and to improve the accuracy of iterates. Our proposed methods can be applied to ill-posed inverse problem, where we establish sampled regularization parameter selection methods. Numerical experiments on very large superresolution and tomographic reconstruction examples demonstrate the efficiency of these sampled limited memory row-action methods.