

Randomization techniques for solving large scale linear algebra problems

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In this talk we discuss randomization techniques for solving large scale linear algebra problems. We focus in particular on solving linear systems of equations and eigenvalue problems. We first introduce a randomized Gram-Schmidt process for orthogonalizing a set of vectors and its block version. We discuss its efficiency and its numerical stability while also using mixed precision. Further randomized GMRES and randomized FOM methods are discussed for solving linear systems of equations as well as randomized Rayleigh-Ritz procedure for solving eigenvalue problems.