A randomized algorithm for rank revealing QR factorizations and applications

Christos Boutsidis

Computer Science
Rensselaer Polytechnic Institute
110 8th Street
Troy, New York 12180
USA
boutsc@cs.rpi.edu

Abstract

The basic steps of a RRQR Factorization are: (i) select columns from the input matrix $A$, (ii) permute them to leading positions to a new matrix $A_p$, (iii) compute a QR Factorization $A_p = QR$, (iv) reveal rank($A$) from $R$. Since their introduction [1, 2], algorithmic trends have involved procedures for deterministically selecting columns from $A$ [3, 4, 5]. Motivated by recent results in theoretical computer science [6, 7, 8] we present a novel algorithm for randomized column selection. Following work in [9] we illustrate our algorithm for approximation of stock market related matrices.

References


