



The Hong Kong Polytechnic University Department of Applied Mathematics

Seminar

Stochastic Gradient Descent Alternating Least Square Method for High-Order Tensor Decomposition

By

Prof. Yanzhao CAO Auburn University

Abstract

High-order tensors have applications in many areas (biology, finance, engineering, etc.). One of the key issues in high-order tensor research is the optimal rank one decomposition of a tensor, which is comparable to the singular value decompositions (SVD) for matrices. Unlike SVD, the rank one decomposition problem for high-order tensors is NP-hard. The Stochastic Gradient Descent Alternating Least Squares (SALS) method is a generalization of the well-known Alternating Least Squares (ALS) method that approximates the canonical decomposition of averages of sampled random tensors. Its simplicity and efficient memory usage make the SALS algorithm ideal for decomposing tensors in an online setting. This talk will discuss the convergence of the SALS.

Biography

Yanzhao Cao received his bachelor's degree and master degree from Jilin University, the doctor of philosophy in mathematics from Virginia Polytechnic Institute and State University. He is currently the Don Logan Chair Professor of Mathematics at Auburn University and the President of the Southeast Regional Chapter of the Society for Applied and Industrial Mathematics (SIAM).

His research interests include numerical solutions of partial and integral equations, numerical solutions of stochastic partial differential equations, nonlinear filtering, and uncertainty quantification. A lot of his works were published in «SIAM J. Numer. Anal.» «Numer. Math.» «Math. Comp.» «IMA J. Numer. Anal.» and other leading international journals in computational mathematics. He is currently serving as an editorial board member of several academic journals including SIAM Journal on Numerical Analysis. His research has been funded by NSF and other grants.

Date: 2 May 2023 (Tuesday) Time: 9:30-10:30 (Hong Kong Standard Time GMT +8) Venue: Online Talk via Zoom (Meeting ID: 937 2446 0949; Passcode: 0502) Speaker: Prof. Yanzhao Cao, Auburn University Host: Dr. Jianbo Cui, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/j/93724460949?pwd=OW5GbEx4V3lyd2RQc2NFa2ttQ29rZz09



Click to join