

Department of Mathematics  
City University of Hong Kong

## Joint Colloquium with College of Engineering

Organised by Dr Weifeng QIU and Dr Xianpeng HU

### Recent Developments of Low Rank Approximation of Matrices

By

Professor Eugene Tyrtyshnikov  
Director, Marchuk Institute of Numerical Mathematics, Russian  
Academy of Science

#### **Abstract :**

In this talk we survey recent essential developments (2, 3) of the ideas of low-rank matrix approximation proposed in (1). The practical importance of the very approach consists in its paradigm of using only small part of matrix entries that allows one to construct a sufficiently accurate approximation in a fast way for “big data” matrices that cannot be placed in any available computer memory and are accessed implicitly through calls to a procedure producing any individual entry in demand. During the two recent decades the approach has become a powerful numerical instrument in a tremendous variety of applications. However, its theoretical grounds still invite the researchers to provide them a better look. We discuss the notable new findings and as well some perspectives and open questions.

(1) S. Goreinov, E. Tyrtyshnikov, N. Zamarashkin, A theory of pseudo-skeleton approximations, *Linear Algebra Appl.* 261 (1997) 1-21.

(2) A. Osinsky, N. Zamarashkin, Pseudo-skeleton approximations with better accuracy estimates, *Linear Algebra Appl.* 537 (2018) 221-249.

(3) A. Osinsky, Probabilistic estimation of the rank 1 cross approximation accuracy, arXiv: 1706.10285 (2017).

**Date:** 2 April 2019 (Tuesday)  
**Time:** 3:30 – 4:30pm  
**Venue:** LT-3, Yeung Kin Man Academic Building (YEUNG)  
City University of Hong Kong

**\*\* All interested are welcome \*\***

For enquiry : 3442-5488

