THE UNIVERSITY   **OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

C O L L O Q U I U M

Trace Ratio Optimization with an Application to Multi-view Learning

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Abstract

This talk concerns a generalized trace ratio optimization problem over the Stiefel manifold

$$\max_{X^{\mathrm{T}}X=I_k} \frac{\mathrm{trace}(X^{\mathrm{T}}AX + X^{\mathrm{T}}D)}{[\mathrm{trace}(X^{\mathrm{T}}BX)]^{\theta}},$$

where $0 \leq \theta \leq 1$ is a parameter. It includes Fisher's linear discriminant analysis ($\theta = 1$ and $D = 0$), a recent orthogonal canonical correlation analysis ($\theta = 1/2$ and $A = 0$), and the unbalanced Procrustes problem ($\theta = 0$) as special cases. We first establish an equivalent relationship between its KKT condition and a nonlinear eigenvalue problem with eigenvector dependency (NEPv) and then develop necessary conditions of its maximizers. A self-consistent-field (SCF) iteration with an alignment step is proposed to solve the problem. It is proved that the method always converges. As an application to multi-view subspace learning, a new framework and its instantiated concrete models are proposed and demonstrated on real world data sets. Numerical results demonstrate that the efficiency of the proposed numerical methods and effectiveness of the new multi-view subspace learning models.

This talk is based on a recent joint work with Li Wang (UT Arlington) and Lei-hong Zhang (Soochow University).

Date:	October 19, 2021 (Tuesday)
Time:	5:30 - 6:30pm
Venue:	Room 210, Run Run Shaw Bldg., HKU

Attendance limited
Register Now

All are welcome