
SYLLABUS FOR MATH 580A4:

LINEAR ALGEBRA FOR DATA SCIENCE III:

MATRIX FACTORIZATIONS AND TRANSFORMATIONS

This one credit course is offered both face-to-face (weeks 6-10) and via CSU on-line section 801 (during weeks 11-15) Fall 2019.

INSTRUCTOR INFORMATION

Instructor: Michael Kirby
Phone: 970 491 6850
Email: Michael.Kirby@Colostate.Edu
Prerequisites: M581A2

Lecture Topics

1. Graphs and Matrices
2. Multidimensional Scaling I: distance matrices and the algorithm
3. Multidimensional scaling II: embedding of unit distance graphs and the circle
4. Fundamental Theorems of MDS
5. The Discrete Fourier transform
6. Angles between subspaces
7. Canonical correlation analysis
8. The GSVD and simultaneously diagonalization
9. Signal fraction analysis
10. Wavelets I: projections onto scaling and wavelet spaces
11. Wavelets II: recursive analysis and synthesis
12. Matching Pursuit
13. Sparse Dictionary Methods (KSVD)
14. Laplacian Eigenmaps and manifold learning
15. Subspace averaging

