

Lecture 0

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Purpose: Reviewing elementary linear algebra and probability theory concepts

Material: Strang (or similar) for linear algebra, Peebles and/or Leon-Garcia (or similar) for probability theory.

Task: Review the following concepts (which you should have covered in prior courses):

- What is orthogonal and orthonormal bases.
- How do you invert an orthonormal matrix by means of its transposed?
- How do you use dot-products to express/project vector data in terms of an alternative axis system?
- Review the eigenvalue and SVD problems. Can you express it fully in terms of matrixes?
- Review the multi-dimensional Gaussian pdf:
- Do you understand the interpretation of the 2 sets of paramaters (mean-vector and covariance matrix)?
- Play with this expression to get a feel for its behaviour. For instance, create a 2-dimensional Gaussian pdf (to your taste) and evaluate and plot its height for a grid of data. Make sure you understand the role of its parameters. How will you approach dimensions higher than 2?

¹http://www.dsp.sun.ac.za/pr813/lectures/0_background/0_background.pdf