

Some questions on PCA and networks.

1. You are given a data set \mathbf{x}_i with N points in D dimensions with mean zero. Show that the direction of maximal variance is obtained by fitting (by least squares) a line to the data.
2. Assume the network in the left-most panel in slide 3 of lecture 3 to represent jointly Gaussian variables. Determine the pattern of zeros of the associated inverse covariance matrix.
3. Determine the probability of autoregulation in an Erdos-Renyi network.
4. In which sense is Pearson's correlation a correlation?