Practical Bioinformatics

Mark Voorhies

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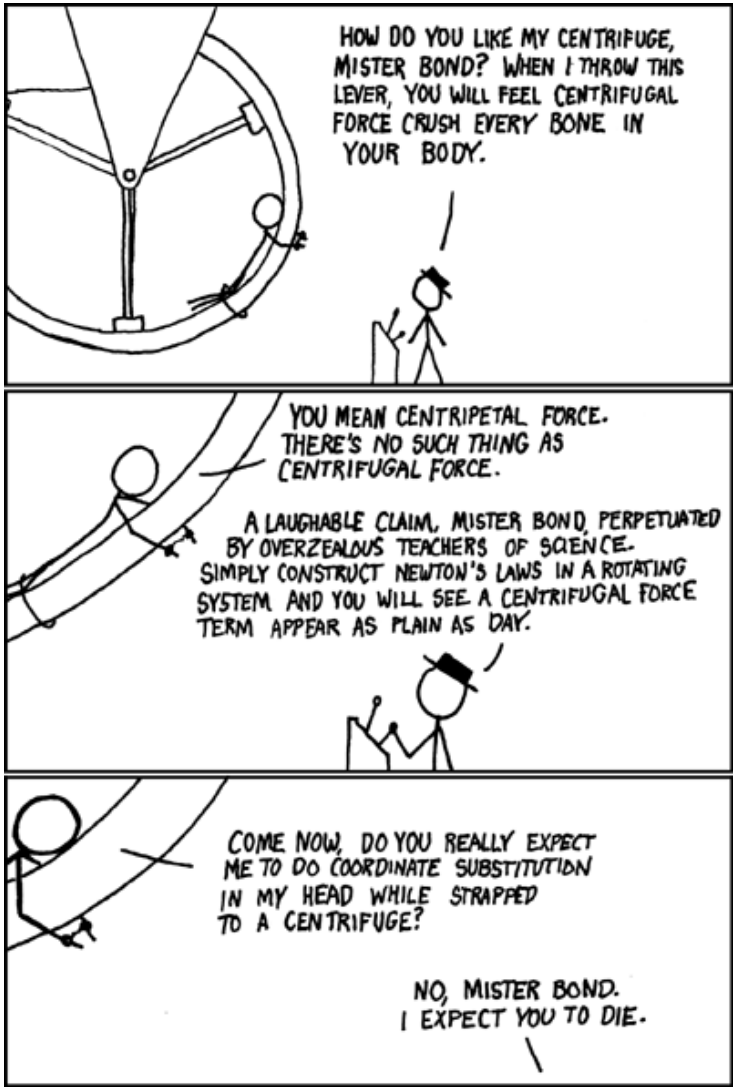
Change of Coordinates



http://xkcd.com/123/

Principal Components Analysis (PCA)

Is there a point of view that makes our data easier to look at?

$$x' = ax + by + cz$$
$$y' = dx + ey + fz$$
$$z' = gx + hy + iz$$

$$\begin{pmatrix} x' \\ y' \\ z' \end{pmatrix} = \begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}$$

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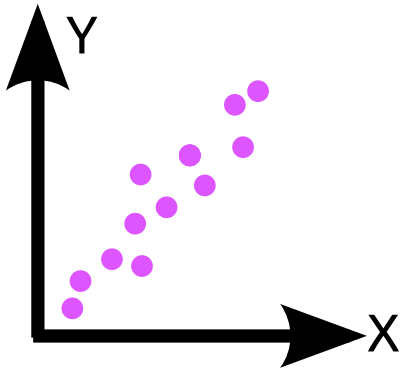
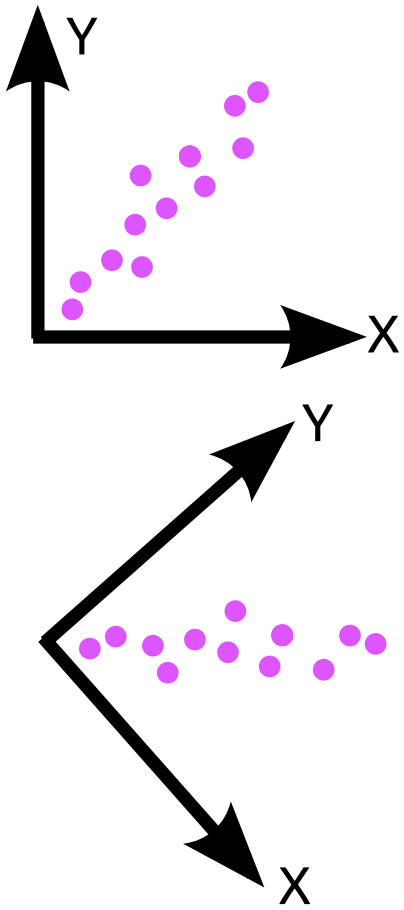
Implemented as Singular Value Decomposition (SVD) after centering (covariance PCA) and, possibly, scaling (correlation PCA)

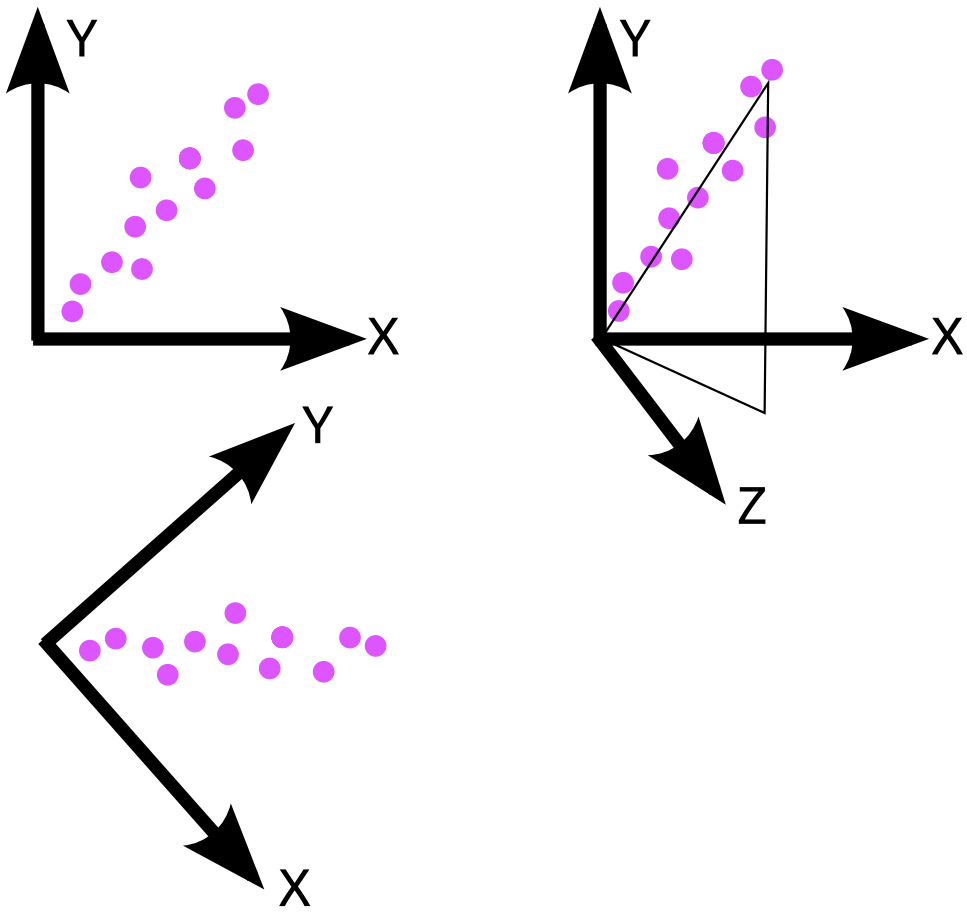
Correlations among more than two samples



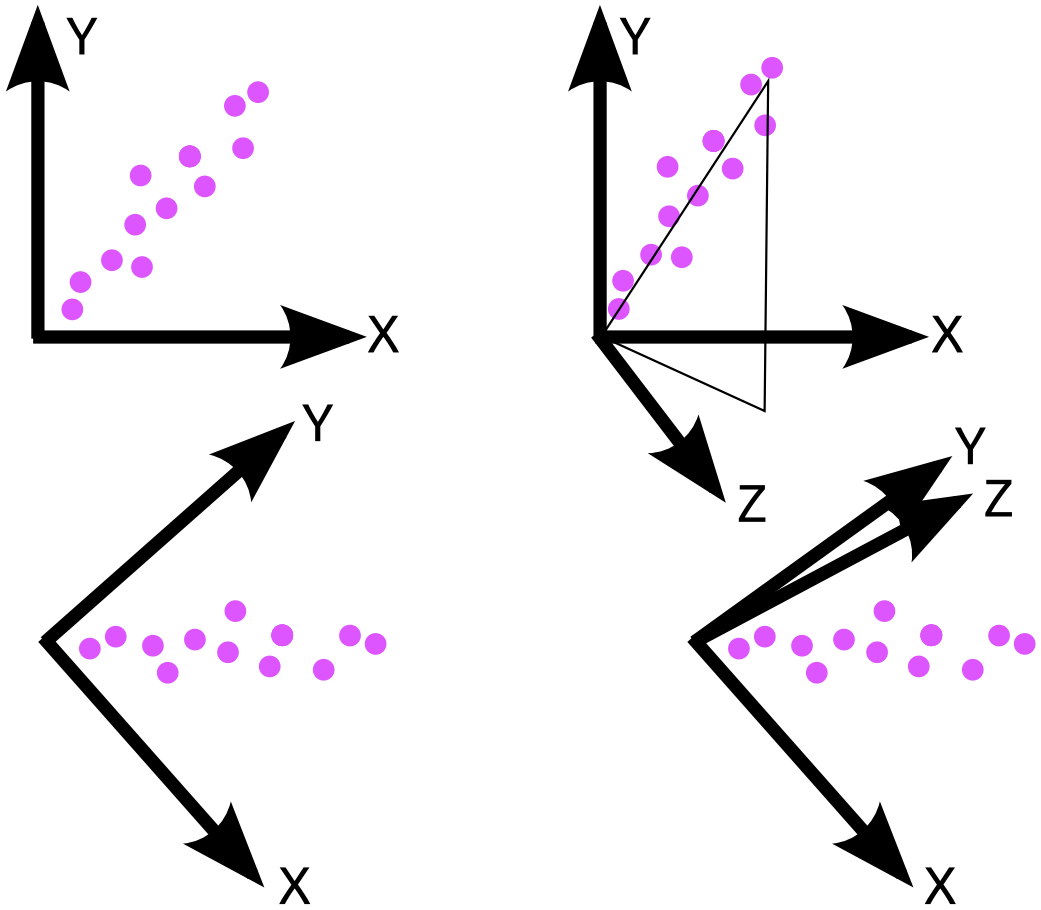
Correlations among more than two samples



Correlations among more than two samples



Correlations among more than two samples



Homework: Dictionaries

1. Write a function to return the antisense strand of a DNA sequence in 3'→5' orientation.
2. Write a function to return the complement of a DNA sequence in 5'→3' orientation.
3. Write a function to translate a DNA sequence