## T-61.271 Information visualization

Exercise 6. Thu 14.11.2002:12-14 T4

- Mathematical methods

1. Is the use of a linear model justified if there is no reason to believe that the data was generated by such a model.

2. What is the effect of data normalization in visualization, especially in the case of ICA and PCA. (For example the crab data set was normalized to zero mean and unit variance before visualization.) Find a linear mapping that transforms data, consisting of $N$ $d$-dimensional vectors, so that the resulting components are uncorrelated and have unit variance (whitening).

3. Metric and Non-metric (ordinal) MDS produce often very similar results. Why?

4. It is said that the metric MDS preserves long distances better than Sammon's mapping and vice versa. Why?

5. You have three points in 2D space.

$$\begin{aligned} A &= (1,2) \\ B &= (3,4) \\ C &= (3,0) \end{aligned}$$

   Find a 1D MDS representation for the points using a MDS model of your choice. You should write the solution equations, but the numerical solution can be solved using numerical methods. HINT: You can fix the position of one of the points and solve for the positions of the other two.