

**Big Data Management and Analytics**  
 WS 2015/16

**Tutorial 9: High Dimensionality Data**

**Assignment 9-1**     *SVD Decomposition*

Given the matrix  $M$ :

$$M = \begin{pmatrix} 1 & 1 \\ 1 & 1 \\ 1 & -1 \end{pmatrix}$$

1. Find the eigenpairs for matrix  $M^T M$
2. Find the SVD for the original matrix  $M = U \Sigma V^T$
3. Compute the one-dimensional approximation of the Matrix  $M$

**Assignment 9-2**     *CUR Decomposition*

Given the matrix

	Matrix	Alien	Star Wars	Casablanca	Titanic
Joe	1	1	1	0	0
Jim	3	3	3	0	0
John	4	4	4	0	0
Jack	5	5	5	0	0
Jill	0	0	0	4	4
Jenny	0	0	0	5	5
Jane	0	0	0	2	2

Find the CUR-decomposition of the matrix, when we pick **two** "random" rows and columns. The columns we pick are *Alien* and *Star Wars* and the rows are the ones of *Jack* and *Jill*.