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# Mathematics for Systems Biology and Bioinformatics

Lecture Prof. Dr. Thomas Filk

Tutorials Dr. Tim Maiwald, Christian Tönsing

## Exercise sheet no. 8

Submission until 19.12.2012 10:00 am in the tutorials

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### Homework 13: Eigenvalues and Eigenvectors (10 Points)

Given matrix  $A$

$$A = \begin{pmatrix} 3 & 5 & 0 \\ 1 & 3 & 2 \\ 0 & 2 & 3 \end{pmatrix}$$

- a) Find the three eigenvalues of matrix  $A$  by using the *characteristic polynomial*.
- b) Use the eigenvalues to calculate the eigenvectors of matrix  $A$ :

$$\det(\lambda_i \mathbb{1} - A) = 0$$

Note, that only the direction of the eigenvectors is determined, but not their length. Find the normalized eigenvalues (length = 1).