

## Lecture 4

### L4.1. ANOVA

- a. Data “*teeth*” contains the result of an experiment, conducted to measure the effect of various doses of vitamin C on the tooth growth (model animal – Guinea pigs). Vitamin C and orange juice were given to animals in different quantities. The data can be taken from <http://edu.sablab.net/data/txt/teeth2.txt>  
Using 2-way ANOVA study the effects of vitamin-C and orange juice.
- b. Work with *mice* data from <http://edu.sablab.net/data/txt/mice.txt>. Study the effects of sex and strain on mouse weight and other parameters.  
*aov*

### L4.2. Linear regression

- a. A biology student wishes to determine the relationship between temperature and heart rate in leopard frog, *Rana pipiens*. He manipulates the temperature in 2° increment ranging from 2 to 18° C and records the heart rate at each interval. His data are presented in table rana.txt
  - 1) Build the model and provide the p-value for linear dependency
  - 2) Provide interval estimation for the slope of the dependency
  - 3) Estimate 95% prediction interval for heart rate at 15°
- b. Data are shown in the Table (<http://edu.sablab.net/data/txt/leukemia.txt>) for two groups of patients who died of acute myelogenous leukemia. Patients were classified into the two groups according to the presence or absence of a morphologic characteristic of white cells. Patients termed AG positive were identified by the presence of Auer rods and/or significant granulation of the leukemic cells in the bone marrow at diagnosis. For AG-negative patients, these factors were absent. Leukemia is a cancer characterized by an overproliferation of white blood cells; the higher the white blood count (WBC), the more severe the disease. Separately for each morphologic group, AG positive and AG negative perform regression analysis of WBC-survival dependency. Consider log-transform the data if necessary.