TAMS38
Computer exercises 2

Preparation: *Read about One-Way and Two-Way ANOVA, F-test, corresponding non-parametric methods and the methods to construct the confidence intervals.*

Bring collection of formulas and tables, and calculators to computer exercise.

1 – Treatment of edema

"As part of a study, 11 edematous patients were studied. By a random sampling technique 6 patients were given the diuretic agent and 5 a placebo. Urine sodium concentrations (mEq/L) were measured 24 hours after admission of the agent or placebo. The results were:"

Agent:	20.4	92.5	61.3	44.2	11.1	23.7
Placebo:	1.2	6.9	33.7	20.4	17.2	

Is there a systematic difference between the groups, and if so in which direction?

a) Put both samples in columns C1 and C2. Do Wilcoxon-Mann-Whitneys test, two-sided on level 0.05. Go to **Stat**/**Nonparametrics**/**Mann Whitney**. Give

test statistics $W = \ldots\ldots$,

P-value $P = \ldots\ldots$

confidence interval $I_{\eta_1-\eta_2} = \ldots\ldots\ldots$,

where η_1 and η_2 is the position parameter of the sample.

b) Go to **Stat/Nonparametrics/Pairwise Differences** and build differences d_{ij} in c3. Sort them in increasing order

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sort C3 C4
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Construct $I_{\eta_1-\eta_2}$ using d_{ij} and a value from the Wilcoxon table.

c) Do the corresponding t-test and interval by going to **Stat/Basic Statistics/ 2-sample t**, do not click on the same variance, but choose **Options** and then put

Confidence level: 0.95
Test mean: 0
Alternative: not equal.

test statistics $W = \ldots\ldots$,
Give P-value = $\ldots\ldots$ $I_{\mu_1-\mu_2} = \ldots\ldots\ldots$.

d) Compare results in (b) and (c), what can you get?

Note Note that assumption about the normal distribution in c) involves choosing density function with non-negligible probability mass on the negative axis. This you can see by comparing the mean and sample standard deviation of the sample. Not in a) can one be sure about the confidence level, as there may not be two similar density functions with different position parameters, when the standard deviations differ as much as in this case. Each d_{ij} is in any case an unbiased estimate of the difference between the expectation values of the two samples.

2 – Kruskal Wallis test

We will now use the data from the 3th exercise from the computer exercise 1 to make pairwise comparisons between the different times. We examined where the amount of energy that infants receive through other food instead of breast milk. Measurements in kilocalories per day (kcal/day) for children breastfed which has been introduced to the

other food at the 4, 5 or 6 month are:

Breast-fed for:	Energy intake (kcal/dag)									
4 months	499	620	469	485	660	588	675	517	649	209
	404	738	628	609	617	704	558	653	548	
5 months	490	395	402	177	475	617	616	587	528	518
	370	431	518	639	368	538	519	506		
6 months	585	647	477	445	485	703	528	465		

Go to our course website to open or download the file *uppg2.MPJ* or put the data again to Minitab.

a) Go to **Stat/Nonparametrics/Kruskal Wallis** and do the non-parametric analysis with $\alpha = 0.05$.
Conclusions:

b) Do the pairwise comparisons between the expectations using **Stat/Nonparametrics/Mann-Whitney**.

$I_{\mu_1-\mu_2} = \ldots\ldots\ldots\ldots\ldots\ldots$

$I_{\mu_1-\mu_3} = \ldots\ldots\ldots\ldots\ldots\ldots$

$I_{\mu_2-\mu_3} = \ldots\ldots\ldots\ldots\ldots\ldots$

What is a simultaneous confidence level?