

## Zadatak ANOVA 3

1)

Ho: svi radnici rade jednakom brzinom. Srednje vrednosti vremena potrebnog da se sasije 10 majica su jednake za sve radnike

Ha: barem dva radnika rade različitom brzinom

$\alpha=0.10$

## One-way ANOVA: RADNIK 1, RADNIK 2, RADNIK 3, RADNIK 4, RADNIK 5

### Method

Null hypothesis All means are equal  
Alternative hypothesis At least one mean is different  
Significance level  $\alpha = 0.1$

Equal variances were assumed for the analysis.

### Factor Information

Factor	Levels	Values
Factor	5	RADNIK 1, RADNIK 2, RADNIK 3, RADNIK 4, RADNIK 5

### Analysis of Variance

Source	DF	Seq SS	Contribution	Adj SS	Adj MS	F-Value	P-Value
Factor	4	3484097	62.20%	3484097	871024	18.51	0.000
Error	45	2117532	37.80%	2117532	47056		
Total	49	5601628	100.00%				

### Model Summary

S	R-sq	R-sq(adj)	PRESS	R-sq(pred)
216.925	62.20%	58.84%	2614236	53.33%

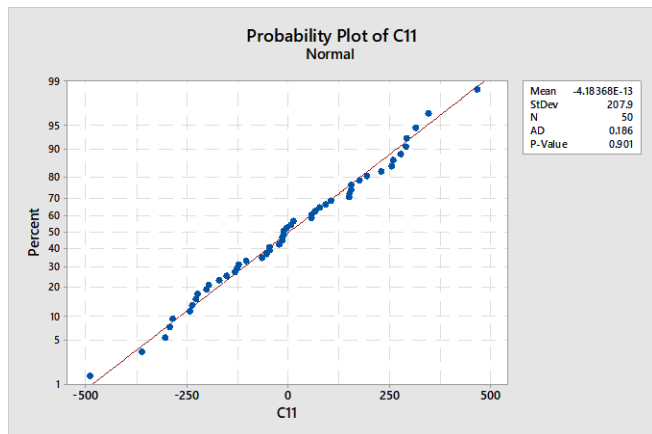
### Means

Factor	N	Mean	StDev	90% CI
RADNIK 1	10	3748.5	40.5	(3633.3, 3863.7)
RADNIK 2	10	3570.0	252.8	(3454.8, 3685.2)
RADNIK 3	10	3390.8	192.2	(3275.6, 3506.0)
RADNIK 4	10	2993.9	161.3	(2878.7, 3109.1)
RADNIK 5	10	3215	327	( 3099, 3330)

Pooled StDev = 216.925

$p=0,00$  je manje od  $\alpha=0.10$  pa odbacujemo Ho i zakljucujemo da barem dva radnika rade različitom brzinom.

2)



Reziduali imaju normalnu raspodelu.

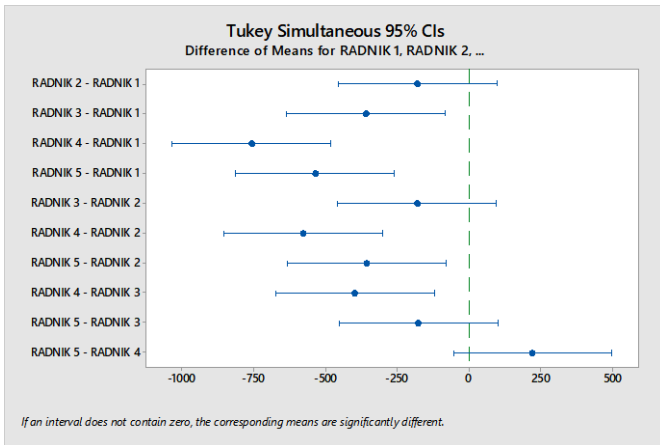
3)

## Tukey Pairwise Comparisons

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
RADNIK 1	10	3748.5	A
RADNIK 2	10	3570.0	A B
RADNIK 3	10	3390.8	B C
RADNIK 5	10	3215	C D
RADNIK 4	10	2993.9	D

Means that do not share a letter are significantly different.

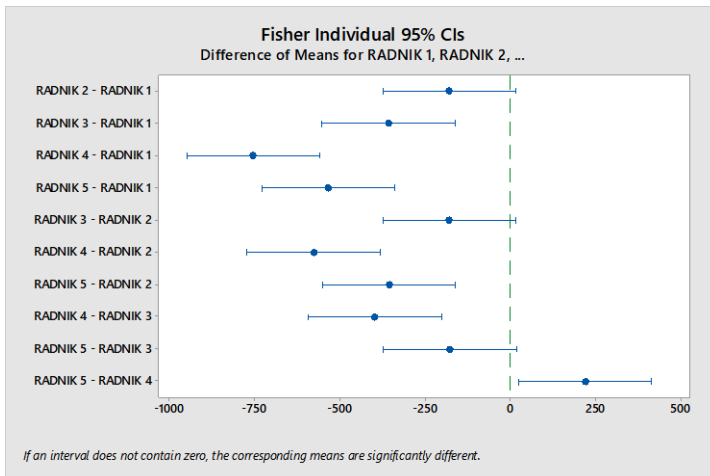


## Fisher Pairwise Comparisons

Grouping Information Using the Fisher LSD Method and 95% Confidence

Factor	N	Mean	Grouping
RADNIK 1	10	3748.5	A
RADNIK 2	10	3570.0	A B
RADNIK 3	10	3390.8	B C
RADNIK 5	10	3215	C
RADNIK 4	10	2993.9	D

Means that do not share a letter are significantly different.



Razlikuju se radnici: 1-3, 1-4, 1-5, 2-4, 2-5, 3-4

4)  
Najbolje radi (najbrže) radnik 4.

5)  
Snaga testa da bude najmanje 90%, za  $\alpha=0.10$

## Power and Sample Size

One-way ANOVA

$\alpha = 0.1$  Assumed standard deviation = 216.925

Factors: 1 Number of levels: 5

Maximum Difference	Sample Size	Target Power	Actual Power
754.6	4	0.9	0.975188

The sample size is for each level.

Dovoljno je da svaki od 5 radnika sašije po 4 majice da bi snaga testa bila 0,9,

6)

Factor	N	Mean	StDev	90% CI
RADNIK 1	10	3748.5	40.5	(3633.3, 3863.7)
RADNIK 2	10	3570.0	252.8	(3454.8, 3685.2)
RADNIK 3	10	3390.8	192.2	(3275.6, 3506.0)
RADNIK 4	10	2993.9	161.3	(2878.7, 3109.1)
RADNIK 5	10	3215	327	( 3099, 3330)

## NAPOMENA:

**Mora se ponovo uraditi ANOVA test sa alfa=0,95!!**

Factor	N	Mean	StDev	95% CI
RADNIK 1	10	3748.5	40.5	<b>(3610.3, 3886.7)</b>
RADNIK 2	10	3570.0	252.8	(3431.8, 3708.2)
RADNIK 3	10	3390.8	192.2	(3252.6, 3529.0)
RADNIK 4	10	2993.9	161.3	<b>(2855.7, 3132.1)</b>
RADNIK 5	10	3215	327	( 3076, 3353)

Najbolje radi (najbrže) radnik 4 i 95% interval poverenja za njega je  
**(2855.7, 3132.1)**

Najsporiji je radnik 1 i 95% interval poverenja je  
**(3610.3, 3886.7)**

Razlika izmedju 90% i 95% intervala poverenja za radnika 4:

90% je (2878.7, 3109.1)

95% je (2855.7, 3132.1)

Ako želimo da budemo sigurniji da će srednja vrednost populacije biti u određenom intervalu, a svi ostali uslovi eksperimenta su jednaki, POVEĆAVA se interval poverenja za povećanu verovatnoću.