جدول ۱.۳ عملکرد بذر گندم با پنج تیمار (میزان کود) و پنج تکرار (بر حسب تن در هکتار)

درصد کود	تکرارها					مجموع Y_i	میانگین $\overline{Y}_i$
	۱	۲	۳	۴	۵		
۰ (شاهد)	۷	۷	۱۵	۱۱	۹	۴۹	۹٫۸
۴	۱۲	۱۷	۱۲	۱۸	۱۸	۷۷	۱۵٫۴
۶	۱۴	۱۸	۱۸	۱۹	۱۹	۸۸	۱۷٫۶
۸	۱۹	۲۵	۲۲	۱۹	۲۳	۱۰۸	۲۱٫۶
۱۰	۷	۱۰	۱۱	۱۵	۱۱	۵۴	۱۰٫۸

مجموع کل = ۳۷۶   ۱۵٫۰۴

تمرین اول محراب عتیقی

```
ONEWAY response BY factor
  /STATISTICS HOMOGENEITY
  /MISSING ANALYSIS
  /POSTHOC=TUKEY DUNCAN LSD DUNNETT ALPHA(0.05).
```

برای انجام آزمون آنوا یکطرفه یا تحلیل واریانس یکطرفه داریم:

Oneway

Notes

Output Created		11-JUN-2021 16:57:13
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
Syntax		ONEWAY response BY factor /STATISTICS HOMOGENEITY /MISSING ANALYSIS /POSTHOC=TUKEY DUNCAN LSD DUNNETT ALPHA(0.05).
Resources	Processor Time	00:00:00.22
	Elapsed Time	00:00:00.39

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
response	Based on Mean	.644	4	20	.637
	Based on Median	.318	4	20	.863
	Based on Median and with adjusted df	.318	4	17.767	.862
	Based on trimmed mean	.656	4	20	.630

ANOVA

response

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	475.760	4	118.940	14.757	.000
Within Groups	161.200	20	8.060		
Total	636.960	24			

باتوجه به خروجی بالا مقدار پی ولیو ما 0 شده و آماره آزمون ما 14.757 شده و این یعنی اینکه تفاوت معناداری بین تیمار های مختلف وجود دارد و فرض 0 ما رد میشود یعنی اینکه با تغییر درصد کود میزان عملکرد بذر گندم نیز متفاوت خواهد بود.

Post Hoc Tests

Multiple Comparisons

Dependent Variable: response

	(I) factor	(J) factor	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Tukey HSD	.00	4.00	-5.60000*	1.79555	.039	-10.9730	-.2270
		6.00	-7.80000*	1.79555	.003	-13.1730	-2.4270
		8.00	-11.80000*	1.79555	.000	-17.1730	-6.4270
		10.00	-1.00000	1.79555	.980	-6.3730	4.3730
	4.00	.00	5.60000*	1.79555	.039	.2270	10.9730
		6.00	-2.20000	1.79555	.737	-7.5730	3.1730

	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
		8.00	-6.20000*	1.79555	.019	-11.5730	-.8270
		10.00	4.60000	1.79555	.116	-.7730	9.9730
	6.00	.00	7.80000*	1.79555	.003	2.4270	13.1730
		4.00	2.20000	1.79555	.737	-3.1730	7.5730
		8.00	-4.00000	1.79555	.210	-9.3730	1.3730
		10.00	6.80000*	1.79555	.009	1.4270	12.1730
	8.00	.00	11.80000*	1.79555	.000	6.4270	17.1730
		4.00	6.20000*	1.79555	.019	.8270	11.5730
		6.00	4.00000	1.79555	.210	-1.3730	9.3730
		10.00	10.80000*	1.79555	.000	5.4270	16.1730
	10.00	.00	1.00000	1.79555	.980	-4.3730	6.3730
		4.00	-4.60000	1.79555	.116	-9.9730	.7730
		6.00	-6.80000*	1.79555	.009	-12.1730	-1.4270
		8.00	-10.80000*	1.79555	.000	-16.1730	-5.4270
LSD	.00	4.00	-5.60000*	1.79555	.005	-9.3455	-1.8545
		6.00	-7.80000*	1.79555	.000	-11.5455	-4.0545
		8.00	-11.80000*	1.79555	.000	-15.5455	-8.0545
		10.00	-1.00000	1.79555	.584	-4.7455	2.7455
	4.00	.00	5.60000*	1.79555	.005	1.8545	9.3455
		6.00	-2.20000	1.79555	.235	-5.9455	1.5455
		8.00	-6.20000*	1.79555	.003	-9.9455	-2.4545
		10.00	4.60000*	1.79555	.019	.8545	8.3455
	6.00	.00	7.80000*	1.79555	.000	4.0545	11.5455
		4.00	2.20000	1.79555	.235	-1.5455	5.9455
		8.00	-4.00000*	1.79555	.038	-7.7455	-.2545
		10.00	6.80000*	1.79555	.001	3.0545	10.5455
	8.00	.00	11.80000*	1.79555	.000	8.0545	15.5455
		4.00	6.20000*	1.79555	.003	2.4545	9.9455
		6.00	4.00000*	1.79555	.038	.2545	7.7455
		10.00	10.80000*	1.79555	.000	7.0545	14.5455
	10.00	.00	1.00000	1.79555	.584	-2.7455	4.7455
		4.00	-4.60000*	1.79555	.019	-8.3455	-.8545
		6.00	-6.80000*	1.79555	.001	-10.5455	-3.0545
		8.00	-10.80000*	1.79555	.000	-14.5455	-7.0545
Dunnett t (2-sided)[b]	.00	10.00	-1.00000	1.79555	.947	-5.7601	3.7601
	4.00	10.00	4.60000	1.79555	.060	-.1601	9.3601
	6.00	10.00	6.80000*	1.79555	.004	2.0399	11.5601
	8.00	10.00	10.80000*	1.79555	.000	6.0399	15.5601

*. The mean difference is significant at the 0.05 level.

b. Dunnett t-tests treat one group as a control, and compare all other groups against it.

باتوجه به خروجی بالا برای آزمون های دانت و دانکن و lsd داریم که هرکدام از ستون اختلافات که دارای * هستند تفاوت معناداری با هم دارند و بیشترین اختلاف هم 11.8 هستش و مشاهده می‌شود که همان * دار ها همشون دارای پی ولیو کمتر

از الفا یا همان 0.05 هستندو درمیابیم که درصد های 4 و 6 نیز با هم تفاوت معناداری ندارد.و در دوستون اخر هم فاصله اطمینانی برای این اختلاف درنظر گرفته شده که با 95درصد اعتماد هستش.

Homogeneous Subsets

response

	factor	N	Subset for alpha = 0.05			
			1	2	3	4
Tukey HSD[a]	.00	5	9.8000			
	10.00	5	10.8000	10.8000		
	4.00	5		15.4000	15.4000	
	6.00	5			17.6000	17.6000
	8.00	5				21.6000
	Sig.		.980	.116	.737	.210
Duncan[a]	.00	5	9.8000			
	10.00	5	10.8000			
	4.00	5		15.4000		
	6.00	5		17.6000		
	8.00	5			21.6000	
	Sig.		.584	.235	1.000	

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.000.

```
NPAR TESTS
  /K-W=response BY factor(0 10)
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		11-JUN-2021 17:06:33
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.

Syntax		NPAR TESTS
		  /K-W=response BY factor(0 10)
		  /STATISTICS DESCRIPTIVES
		  /MISSING ANALYSIS.

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00
	Number of Cases Allowed[a]	449389

a. Based on availability of workspace memory.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
response	25	15.0400	5.15170	7.00	25.00
factor	25	5.6000	3.51188	.00	10.00

Kruskal-Wallis Test

Ranks

	factor	N	Mean Rank
response	.00	5	5.50
	4.00	5	13.20
	6.00	5	17.00
	8.00	5	22.60
	10.00	5	6.70
	Total	25	

Test Statistics[a,b]

	response
Kruskal-Wallis H	19.064
df	4
Asymp. Sig.	.001

a. Kruskal Wallis Test

b. Grouping Variable: factor

در آزمون کراسکوال والیس نیز از آنجایی که مقدر پی ولیو کمتر از 0.05 شده است ولذا می‌توانیم بگوییم که فرض برابری

```
UNIANOVA response BY factor
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /SAVE=PRED RESID ZRESID SRESID
  /CRITERIA=ALPHA(0.05)
  /DESIGN=factor.
```

Univariate Analysis of Variance

Notes

Output Created		11-JUN-2021 17:11:50
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		UNIANOVA response BY factor /METHOD=SSTYPE(3) /INTERCEPT=INCLUDE /SAVE=PRED RESID ZRESID SRESID /CRITERIA=ALPHA(0.05) /DESIGN=factor.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
Variables Created or Modified	PRE_1	Predicted Value for response
	RES_1	Residual for response
	ZRE_1	Standardized Residual for response
	SRE_1	Studentized Residual for response

Between-Subjects Factors

		N
factor	.00	5
	4.00	5
	6.00	5
	8.00	5
	10.00	5

Tests of Between-Subjects Effects

Dependent Variable: response

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	475.760ᵃ	4	118.940	14.757	.000
Intercept	5655.040	1	5655.040	701.618	.000
factor	475.760	4	118.940	14.757	.000
Error	161.200	20	8.060		
Total	6292.000	25			
Corrected Total	636.960	24			

a. R Squared = .747 (Adjusted R Squared = .696)

```
GRAPH
  /SCATTERPLOT(BIVAR)=PRE_1 WITH RES_1
  /MISSING=LISTWISE.
```

با توجه به بدست آوردن مقادیر باقی مانده های عادی و استاندارد شده و استیودنت شده به رسم نمودار احتمال میپردازیم:

Graph

Notes

Output Created		11-JUN-2021 17:15:03
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25
Syntax		GRAPH
		/SCATTERPLOT(BIVAR)=PRE_1
		WITH RES_1
		/MISSING=LISTWISE.

Resources	Processor Time	00:00:00.22
	Elapsed Time	00:00:00.17

نمودار باقی مانده های ما دربرابر مقادیر پیشبینی شده بصورت بالا میباشد.

```
GRAPH
  /SCATTERPLOT(BIVAR)=PRE_1 WITH ZRE_1
  /MISSING=LISTWISE.
```
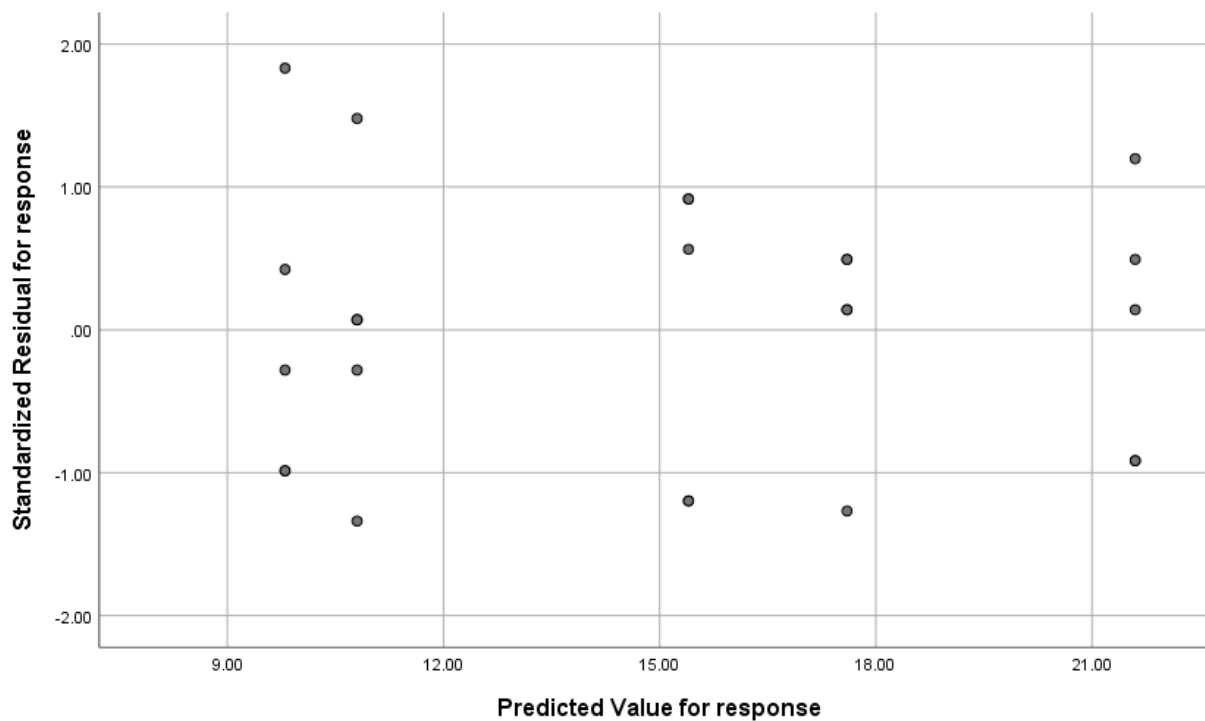
Graph

Notes

Output Created		11-JUN-2021 17:17:12
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25
Syntax		GRAPH
		/SCATTERPLOT(BIVAR)=PRE_1
		WITH ZRE_1
		/MISSING=LISTWISE.

Resources	Processor Time	00:00:00.23
	Elapsed Time	00:00:00.17

نمودار باقی مانده های استاندارد شده ما دربرابر مقادیر پیشبینی شده بصورت بالا میباشد.

```
GRAPH
  /SCATTERPLOT(BIVAR)=PRE_1 WITH SRE_1
  /MISSING=LISTWISE.
```

Graph

Notes

Output Created		11-JUN-2021 17:17:28
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	25

Syntax		GRAPH
		/SCATTERPLOT(BIVAR)=PRE_1
		WITH SRE_1
		/MISSING=LISTWISE.
Resources	Processor Time	00:00:00.20
	Elapsed Time	00:00:00.17
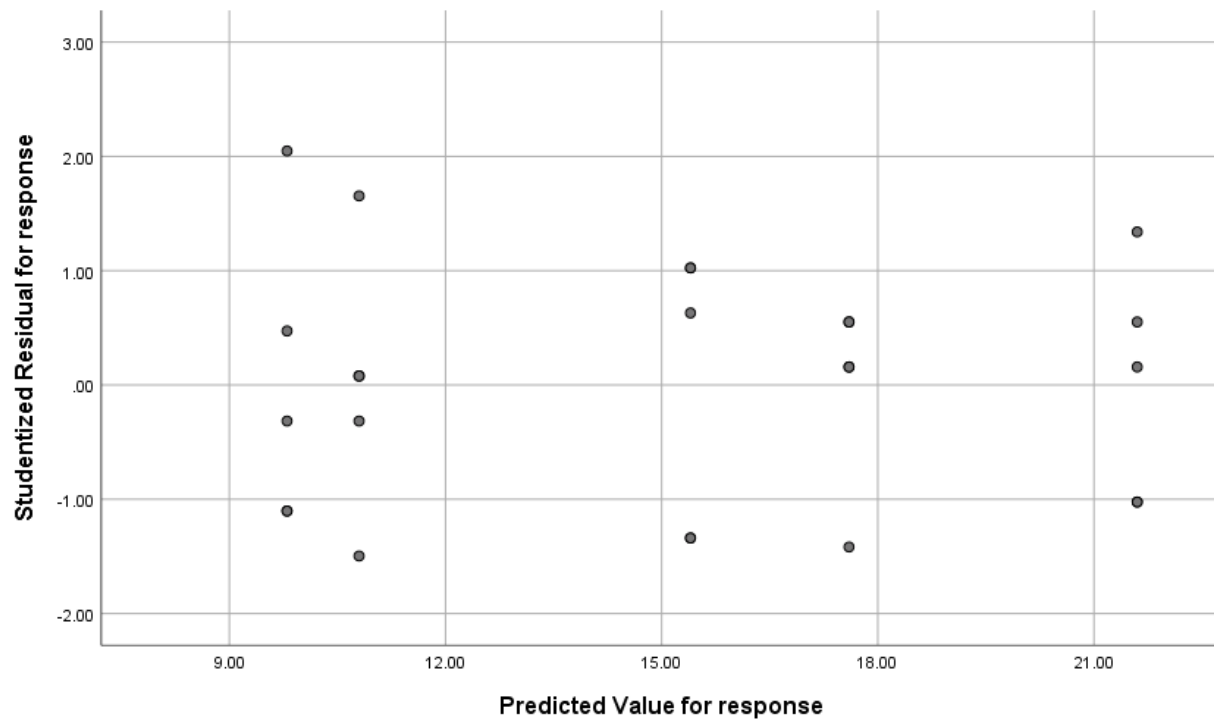
نمودار باقی مانده های استیودنت شده ما دربرابر مقادیر پیشبینی شده بصورت بالا میباشد.

```
PPLOT
  /VARIABLES=RES_1
  /NOLOG
  /NOSTANDARDIZE
  /TYPE=P-P
  /FRACTION=BLOM
  /TIES=MEAN
  /DIST=NORMAL.
```

PPlot

Notes

Output Created		11-JUN-2021 17:18:35
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	25
	Date	<none>
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	For a given sequence or time series variable, cases with missing values are not used in the analysis. Cases with negative or zero values are also not used, if the log transform is requested.

Syntax		PPLOT
		  /VARIABLES=RES_1
		  /NOLOG
		  /NOSTANDARDIZE
		  /TYPE=P-P
		  /FRACTION=BLOM
		  /TIES=MEAN
		  /DIST=NORMAL.

Resources	Processor Time	00:00:00.34
	Elapsed Time	00:00:00.27
Use	From	First observation
	To	Last observation
Time Series Settings (TSET)	Amount of Output	PRINT = DEFAULT
	Saving New Variables	NEWVAR = CURRENT
	Maximum Number of Lags in Autocorrelation or Partial Autocorrelation Plots	MXAUTO = 16
	Maximum Number of Lags Per Cross-Correlation Plots	MXCROSS = 7
	Maximum Number of New Variables Generated Per Procedure	MXNEWVAR = 60
	Maximum Number of New Cases Per Procedure	MXPREDICT = 1000
	Treatment of User-Missing Values	MISSING = EXCLUDE
	Confidence Interval Percentage Value	CIN = 95
	Tolerance for Entering Variables in Regression Equations	TOLER = .0001
	Maximum Iterative Parameter Change	CNVERGE = .001
	Method of Calculating Std. Errors for Autocorrelations	ACFSE = IND
	Length of Seasonal Period	Unspecified

Model Description

Model Name		MOD_1
Series or Sequence	1	Residual for response
Transformation		None
Non-Seasonal Differencing		0
Seasonal Differencing		0
Length of Seasonal Period		No periodicity
Standardization		Not applied
Distribution	Type	Normal
	Location	estimated
	Scale	estimated
Fractional Rank Estimation Method		Blom's
Rank Assigned to Ties		Mean rank of tied values

Applying the model specifications from MOD_1

Case Processing Summary

		Residual for response
Series or Sequence Length		25
Number of Missing Values in the Plot	User-Missing	0
	System-Missing	0

The cases are unweighted.

Estimated Distribution Parameters

		Residual for response
Normal Distribution	Location	.0000
	Scale	2.59165

The cases are unweighted.

Residual for response

Normal P-P Plot of Residual for response
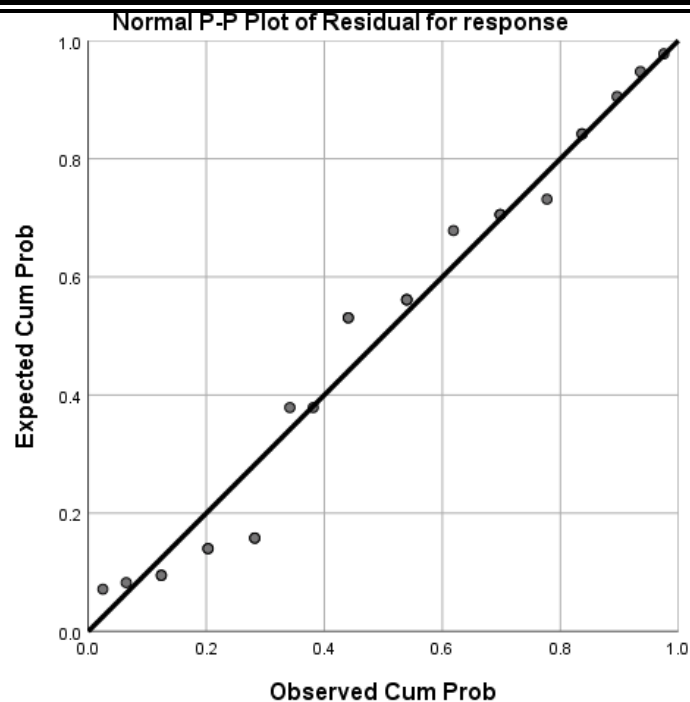
همانطور که داریم میبینیم نمودار احتمال نرمال ما نشان دهنده توزیع نرمال میباشد زیرا نقاط همگی در یک راستا قرار
دارند و میتوان گفت که از توزیع نرمال پیروی میکنند.

Detrended Normal P-P Plot of Residual for response
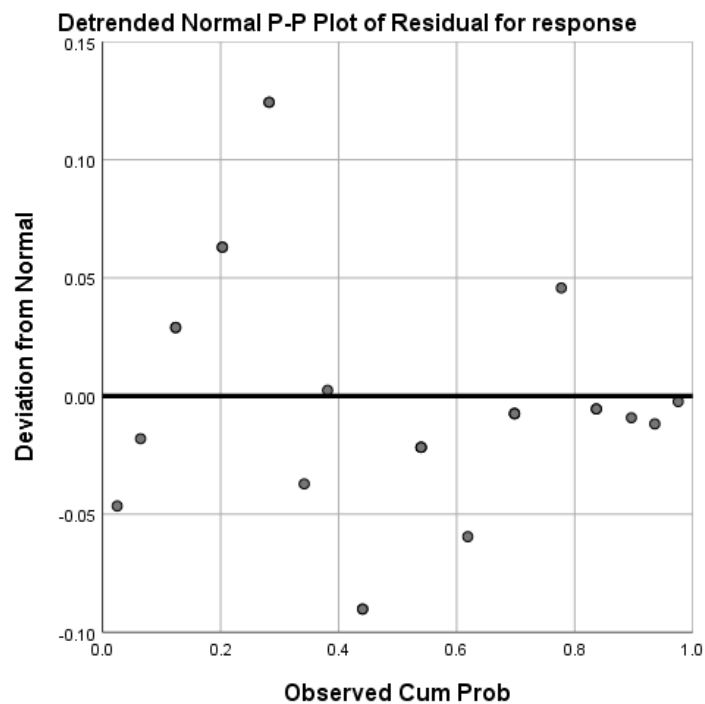
```
DATASET ACTIVATE DataSet0.
DATASET ACTIVATE DataSet0.

SAVE OUTFILE='F:\lessons\'codes\first.sav\طرح آزمایش ها
   /COMPRESSED.
DATASET ACTIVATE DataSet0.
```

حال به بررسی همان خروجی ها برای نرم افزار R می پردازیم:

```
> # exercise one:
> percent<-c(rep(c(0,4,6,8,10)))
> values<-c(7,7,15,11,9,
+          12,17,12,18,18,
+          14,18,18,19,19,
+          19,25,22,19,23,
+          7,10,11,15,11)
> data<-matrix(values,ncol = 5 , byrow = FALSE )
> colnames(data)=c(1:5)
> rownames(data)=percent
> #Now we can see our data :
> data
     1   2   3   4   5
0    7  12  14  19   7
4    7  17  18  25  10
6   15  12  18  22  11
8   11  18  19  19  15
10   9  18  19  23  11
```

```
> #Now we want to oneway analize variance:

> response<-values

> treatments=factor(rep(percent,each=5))

> head(g<-data.frame(response,treatments),10)

   response treatments

1        7          0

2        7          0

3       15          0

4       11          0

5        9          0

6       12          4

7       17          4

8       12          4

9       18          4

10      18          4

> fit<-lm(response~treatments)

> summary(fit)

Call:

lm(formula = response ~ treatments)

Residuals:

   Min      1Q Median     3Q     Max

  -3.8    -2.6    0.4    1.4     5.2

Coefficients:

            Estimate Std. Error t value Pr(>|t|)

(Intercept)    9.800      1.270   7.719 2.02e-07 ***

treatments4    5.600      1.796   3.119 0.005409 **

treatments6    7.800      1.796   4.344 0.000315 ***

treatments8   11.800      1.796   6.572 2.11e-06 ***

treatments10   1.000      1.796   0.557 0.583753

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.839 on 20 degrees of freedom

Multiple R-squared:  0.7469,   Adjusted R-squared:  0.6963

F-statistic: 14.76 on 4 and 20 DF,   p-value: 9.128e-06
```

باتوجه به مقادیر پی ولیو مشاهده می‌شود که همگی آنها کمتر از 0.05 هستند بجز میزان کود 10 درصد یعنی همگی آنها اختلاف تاثیر

معناداری بروی میزان باروری دارند بجز 10 درصد.

```
> anova(fit)

Analysis of Variance Table


Response: response

          Df Sum Sq Mean Sq F value    Pr(>F)
treatments  4 475.76  118.94  14.757 9.128e-06 ***
Residuals  20 161.20    8.06
```

‫‪---‬ دقیقا بطور مشابه خروجی نرم افزار‬ spss ‫اینجا هم پی ولیو ما معنادار و فرض‬ 0 ‫ما رد میشود و اختلاف معناداری وجود دارد.‬

```
> #for LSD test we have:

> #install.packages("agricolae")

> #library("agricolae")

> lsd<-LSD.test(fit,"treatments",alpha = 0.05)

> lsd
$statistics
  MSerror Df  Mean       CV  t.value      LSD
     8.06 20 15.04 18.87642 2.085963 3.745452


$parameters
       test p.ajusted    name.t ntr alpha
  Fisher-LSD      none treatments   5  0.05


$means
    response      std r        LCL      UCL Min Max Q25 Q50 Q75
0        9.8 3.346640 5   7.151566 12.44843   7  15   7   9  11
10      10.8 2.863564 5   8.151566 13.44843   7  15  10  11  11
4       15.4 3.130495 5  12.751566 18.04843  12  18  12  17  18
6       17.6 2.073644 5  14.951566 20.24843  14  19  18  18  19
8       21.6 2.607681 5  18.951566 24.24843  19  25  19  22  23


$comparison
NULL
```

```
$groups

    response groups
8       21.6       a
6       17.6       b
4       15.4       b
10      10.8       c
0        9.8       c
```

آنهایی که گروه های جلویشان یکی هستش اختلاف معناداری با یکدیگرندارند.

```
attr(,"class")
[1] "group"
>
> #tukey test:
> TukeyHSD(aov(fit))
  Tukey multiple comparisons of means
    95% family-wise confidence level


Fit: aov(formula = fit)


$treatments
      diff        lwr        upr     p adj
4-0    5.6   0.2270417 10.9729583 0.0385024
6-0    7.8   2.4270417 13.1729583 0.0025948
8-0   11.8   6.4270417 17.1729583 0.0000190
10-0   1.0  -4.3729583  6.3729583 0.9797709
6-4    2.2  -3.1729583  7.5729583 0.7372438
8-4    6.2   0.8270417 11.5729583 0.0188936
10-4  -4.6  -9.9729583  0.7729583 0.1162970
8-6    4.0  -1.3729583  9.3729583 0.2101089
10-6  -6.8 -12.1729583 -1.4270417 0.0090646
10-8 -10.8 -16.1729583 -5.4270417 0.0000624
```

باتوجه به مقادیر پی ولیو آنهایی که از ۰.۰5 کمتر هستند اختلاف معناداری دارند و آنهایی که بیشتراز ۰.۰5 هستند اختلاف معناداری ندارد و

فرض ۰ آنها پذیرش می‌شود.

```
>

> #Duncan test:

> duncan<-duncan.test(fit,"treatments",alpha = 0.05)

> duncan

$statistics

  MSerror Df  Mean        CV

     8.06 20 15.04 18.87642


$parameters

    test       name.t ntr alpha

  Duncan treatments   5  0.05


$duncan

      Table CriticalRange

2 2.949998      3.745452

3 3.096506      3.931466

4 3.189616      4.049682

5 3.254648      4.132249


$means

   response        std r Min Max Q25 Q50 Q75

0       9.8 3.346640 5   7  15   7   9  11

10     10.8 2.863564 5   7  15  10  11  11

4      15.4 3.130495 5  12  18  12  17  18

6      17.6 2.073644 5  14  19  18  18  19

8      21.6 2.607681 5  19  25  19  22  23


$comparison

NULL

$groups

   response groups

8      21.6      a

6      17.6      b

4      15.4      b

10     10.8      c

0       9.8      c
```

```
attr(,"class")

[1] "group"

>

> #for ploting the residuals we have:

> x<-fit$fitted.values

> y1<-residuals(fit)

> y2<-rstandard(fit)

> y3<-rstudent(fit)

> par(mfrow=c(1,3))

> plot(x,y1 , xlab = "predictions" , ylab = "residuals" , col="Orange" , type="p")

> plot(x,y1 , xlab = "predictions" , ylab = "standard residuals" , col="Blue" ,
type="p")

> plot(x,y1 , xlab = "predictions" , ylab = "students residuals" , col="Black" ,
type="p")
```
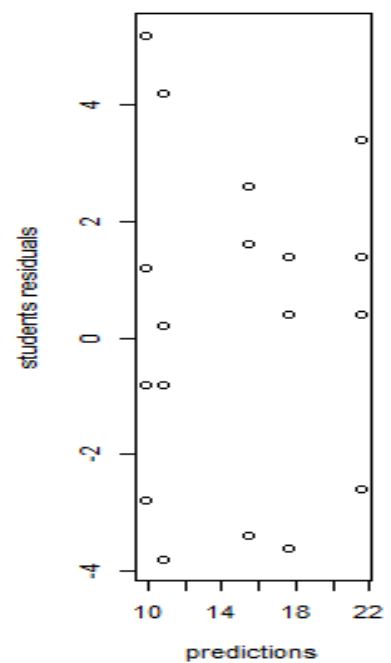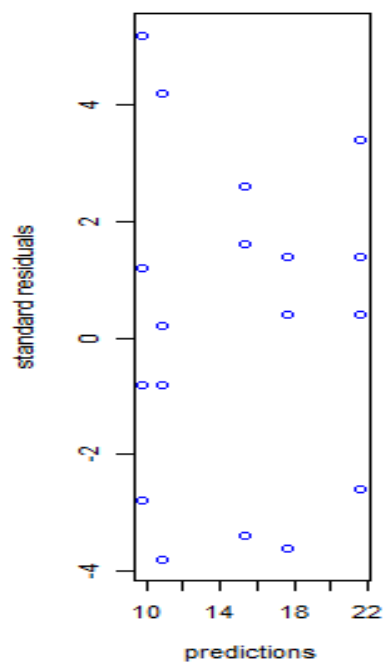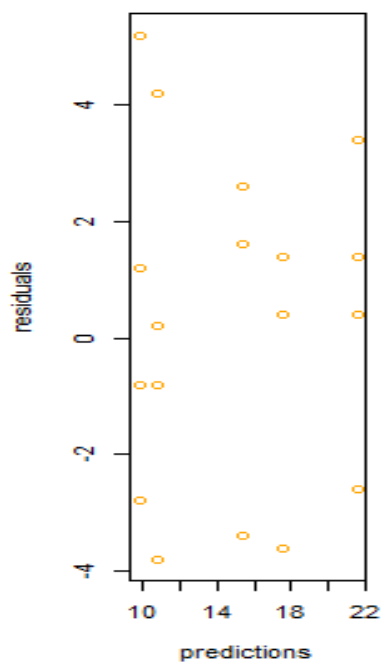
```
> #kruskal walis test:
> kruskal.test(response~treatments , data = g)


        Kruskal-Wallis rank sum test


data:  response by treatments
Kruskal-Wallis chi-squared = 19.064, df = 4, p-value = 0.0007636
```

<div dir="rtl">

ولذا فرض برابر میانگین ها نیز ردمی‌شود.

حال به بررسی یک مقابله دلخواه میپردازیم:

</div>

```
> #so we can say the means arre not equal
>
> #contrasts:
> #for example we want to test that
> #mu1 + 2mu2+mu3-3mu4-mu5= 0
> C1<-factor(rep(c(1,2,1,-3,-1) , each = 5 ))
> g[,3]<-C1;colnames(g)=c("response" , "treatments" , "C1 (contrast)")
> g
    response treatments C1 (contrast)
1        7          0            1
2        7          0            1
3       15          0            1
4       11          0            1
5        9          0            1
6       12          4            2
7       17          4            2
8       12          4            2
9       18          4            2
10      18          4            2
11      14          6            1
12      18          6            1
13      18          6            1
14      19          6            1
15      19          6            1
16      19          8           -3
17      25          8           -3
18      22          8           -3
```

```
19        19          8           -3

20        23          8           -3

21         7         10           -1

22        10         10           -1

23        11         10           -1

24        15         10           -1

25        11         10           -1

>

> #now for test it we have:

> contrast<-lm(response~C1 , data=g)

> anova(contrast)

Analysis of Variance Table


Response: response

          Df Sum Sq Mean Sq F value   Pr(>F)

C1         3 323.66 107.887  7.2315 0.001632 **

Residuals 21 313.30  14.919

---

Signif. codes:  0 ´***´ 0.001 ´**´ 0.01 ´*´ 0.05 ´.´ 0.1 ´ ´ 1
```

از آنجایی که پی ولیو ما کمتر از 0.05 شده است ولذا فرض 0 مقابله ما رد می شود یعنی فرض 0= mu5-3mu4-3mu3+2mu2 + mu1 رد می‌شود.