

No.: Tugas Ancova

Date:

NO	Treatment A		Treatment B	
	X	Y	X	Y
1	175	135	205	165
2	175	145	175	195
3	235	205	230	160
4	215	175	190	155
5	195	140	155	150
6	195	190	185	170

Penyelesaian ?

Statistik	A1	A2	Total
N	6	6	12
$\sum X$	1190	1140	2330
$\sum X^2$	238.750	219.900	458.650
$\sum Y$	990	995	1.985
$\sum Y^2$	167.600	166.275	333.875
$\sum XY$	199.150	188.900	388.050
\bar{X}	198,3	190	388,3
\bar{Y}	165	165,8	330,8

OK KEY

Langkah-langkah perhitungan

A. Sumber Variasi Total (Residu)

$$\textcircled{1} JK_{Yt} = \sum Y_t^2 = \sum Y_t^2 - \frac{(\sum Y_t)^2}{N}$$

$$= 333.875 - \frac{(1.985)^2}{12}$$

$$= 5522,91$$

$$\textcircled{2} JK_{Xt} = \sum X_t^2 = \sum X_t^2 - \frac{(\sum X_t)^2}{N}$$

$$= 458.650 - \frac{(2330)^2}{12} = 6241,66$$

$$\textcircled{3} JP_{Xt} = \sum xy = \sum xy - \frac{(\sum x)(\sum y)}{N}$$

$$= 380.050 - \frac{(2330)(1985)}{12} = 2629,16$$

$$\textcircled{4} \text{Beta}_t = \frac{\sum xy}{\sum x^2} = \frac{2629,16}{6241,66} = 0,42$$

$$\textcircled{5} JK_{\text{regt}} = \beta \times \sum xy$$

$$= 0,42 \times 2629,16 = 1104,24$$

$$\textcircled{6} JK_{\text{resn}} = JK_{Yt} - JK_{\text{regt}}$$

$$= 5522,91 - 1104,24$$

$$= 4418,67$$

B. Sumber Variasi Dalam (JK dalam residu)

$$(1) JK_{Yd} = \sum Y^2_t = \sum Y_t^2 - \frac{(\sum Y_A)^2}{NA}$$

$$= 333.875 - \left(\frac{(990)^2}{6} + \frac{(995)^2}{6} \right)$$

$$= 5520,83$$

$$(2) JK_{Xd} = \sum X^2_t = \sum X_t^2 - \frac{(\sum X_A)^2}{NA}$$

$$= 458.650 - \left(\frac{1190^2}{6} + \frac{1140^2}{6} \right)$$

$$= 6033,33$$

$$(3) JK_{XdYd} = \sum X_t Y_t = \sum X_t Y_t - \frac{(\sum X_A)(\sum Y_A)}{NA}$$

$$= 3870.050 - \left(\frac{1190 \times 990}{6} + \frac{1140 \times 995}{6} \right)$$

$$= 2650$$

$$(4) \text{Betad} = \frac{\sum X_t Y_t}{\sum X_t^2}$$

$$= \frac{2650}{6033,33}$$

$$= 0,43$$

$$(5) JK_{regd} = B_d \times \sum X_t Y_t$$

$$= 0,43 \times 2650$$

$$= 1139,5$$

$$(6) JK_{restt} = JK_{Yd} - JK_{regd}$$

$$= 5520,83 - 1139,5$$

$$= 4381,33$$

No.:

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C. Sumber Variasi Antar

$$\begin{aligned} \text{JKA} &= \text{JK}_{\text{restt}} - \text{JK}_{\text{reste}} \\ &= 4418,67 - 4381,33 \\ &= 37,34 \end{aligned}$$

D. Menghitung Derajat Kebebasan

$$\begin{aligned} \text{DKA} &= a - 1 \\ &= 2 - 1 = 1 \end{aligned}$$

$$\begin{aligned} \text{DKD} &= N - a - M \\ &= 12 - 2 - 1 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{DKT} &= N - 1 - M \\ &= 12 - 1 - 1 = 10 \end{aligned}$$

E. Menghitung harga Rk (rata-rata kuadrat)

$$\text{RKA} = \frac{\text{JKA}}{\text{DKA}} = \frac{37,34}{1} = 37,34$$

$$\text{RKD} = \frac{\text{JKD}}{\text{DKD}} = \frac{4381,33}{9} = 486,81$$

F. Menghitung harga F

$$F^* = \frac{\text{RKA}}{\text{RKD}} = \frac{37,34}{486,81} = 0,07$$

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Rangkuman ANOVA

Statistik	JK	DK	RK	F	F tabel
Antar	37,34	1	37,34	0,07	5,12
Dalam (error)	1139,5	9	126,61	-	-
Total (Residu)	4418,61	10	-	-	-

Hipotesis

$H_0: \mu_1 = \mu_2$ (tidak terdapat perbedaan nilai variabel X antara yg menggunakan metode treatment A dan B)

$H_a: \mu_1 \neq \mu_2$ (terdapat perbedaan nilai variabel X antara yang menggunakan metode treatment A dan B)

Berdasarkan perhitungan $F_{hitung} = 0,07$ dan $F_{tabel} (1-0,05; 1; 9) = 5,12$. Maka $F_{hitung} < F_{tabel}$, maka H_0 diterima.

Kriteria Pengujian :

Tolak H_0 jika $F_{hitung} > F(\alpha; DK_A; DK_B)$

Tolak H_0 jika $F_{hitung} < F(\alpha; DK_A; DK_B)$

No:

ANALISIS KORELASI

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Test score (out of 10) (x)	Hour playing video games per weekly (y)
8	2
3	2
5	1.5
7	1
1	2.5
2	3
6	1.5
7	2
4	2
9	1.5

Tabel Perhitungan

NO	x_i	y_i	$x_i y_i$	x_i^2	y_i^2
1	8	2	16	64	4
2	3	2	6	9	4
3	5	1.5	7.5	25	2.25
4	7	1	7	49	1
5	1	2.5	2.5	1	6.25
6	2	3	6	4	9
7	6	1.5	9	36	2.25
8	7	2	14	49	4
9	4	2	8	16	4
10	9	1.5	13.5	81	2.25
Sum	52	19	89.5	334	39

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$$r_{xy} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n \sum x_i^2 - (\sum x_i)^2)(n \sum y_i^2 - (\sum y_i)^2)}}$$

$$= \frac{10 \cdot 89,5 - 52 \cdot 19}{\sqrt{(10 \cdot 334 - (52)^2)(10 \cdot 39 - (19)^2)}}$$

$$= \frac{-93}{\sqrt{18.444 \cdot 135,80}} = \frac{-93}{135,80} = -0,68$$

Dari hasil ini didapat korelasi negatif antara test score (x) dan hours playing video games per week (y)