

Assignment: 3.4

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Example.	(\bar{x}_1)	(\bar{x}_2)	(\bar{x}_3)	(\bar{x}_4)	Total
Plots/ Fertilizers	A (n_1)	B (n_2)	C (n_3)	D (n_4)	
Nitrogen (mg)	6	4	8	6	24
Potash	7	6	6	9	28
phosphates	8	5	10	9	32
Total	21	15	24	24	84

H_0 = There is no diff. make by fertilizers in yield

H_1 = There is significant diff. make by fertilizers.

A	B	C	D
$n_1 = 3$	$n_2 = 3$	$n_3 = 3$	$n_4 = 3$
$\bar{x}_1 = 7$	$\bar{x}_2 = 5$	$\bar{x}_3 = 8$	$\bar{x}_4 = 8$
$s_1^2 = 0.1$	$s_2^2 = 0.1$	$s_3^2 = 0.4$	$s_4^2 = 0.3$

No. of independ.

levels $k = 4$

$$N = (n_1 + n_2 + n_3 + n_4) = 12$$

$$\bar{X} = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4} = \frac{7+5+8+8}{4}$$

$$\bar{X} = 28/4 = 7$$

$$\boxed{\bar{X} = 7}$$



Now, we have Anova coefficient:

$$(F) \text{ Anova coeff.} = \frac{MST}{MSE} \dots$$

For MST,

$$MST = \frac{\text{sum of squares total by treat.}}{k-1} = \frac{SST}{k-1} \dots (i)$$

$$\text{where, } SST = \sum_{j=1}^4 n_j (\bar{x}_j - \bar{x})^2$$

$$= 3(0) + 3($$

$$= 3(7-7)^2 + 3(5-7)^2 + 3(8-7)^2 + 3(8-7)^2$$

$$= 12 + 3 + 3$$

$$\boxed{SST = 18}$$

put in eqⁿ (i)

$$MST = \frac{18}{k-1}$$

$$= \frac{18}{3}$$

$$\boxed{MST = 6}$$

For MSE,

$$MSE = \frac{\text{sum of square total by Error}}{n-k} = \frac{SSE}{n-k} \dots (ii)$$

$$\text{where, } SSE = \sum (n_j - 1) (s_j^2)$$

$$= (2)(1) + (2)(1) + (2)(4) + (2)(3)$$

$$= 2 + 2 + 8 + 6$$

$$\boxed{SSE = 18}$$

put in eqn (ii)

$$MSE = \frac{18}{N-k}$$

$$= \frac{18}{12-4}$$

$$= 18/8$$

$$MSE = 2.22$$

Hence, the coeff. of variation is,

$$F = 6/2.22$$

$$F_{stat} = 2.70$$

Now, for critical

$$dof_1 = k-1 = 4-1 = 3$$

$$dof_2 = N-k = 12-4 = 8$$

$$F_{crit} = 4.066$$

by comparing, we get,

$$F_{stat} < F_{crit}$$

Null hypothesis is accepted so,
there is no diff. made by fertilizers in yield.