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2.1.90

STAT 512

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Problems

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1. The linear model for 2 independent samples includes the terms, μ, τ_i, and e_{ij}. Some hypothetical values are given for these parameters below:

$\mu = 70$ $\tau_1 = 3$ $\tau_2 = -3$

	e_{ij} i		$X_{ij}(\mu + e_{ij})$ i		Y_{ij} i	
j	1	2	1	2	1	2
1	-6	0	64	70	67	67
2	+2	+4	72	74	75	71
3	+4	-2	74	68	77	65
4	+2	-6	72	64	75	61
5	-4	6	66	76	69	73
6	-2	-4	68	66	71	63
7	+4	2	74	72	77	69

$\mu = \bar{Y}_{..} = 70$

$\bar{X}_{1.} = 70$ $\bar{X}_{2.} = 70$ $\bar{Y}_{1.} = 73$ $\bar{Y}_{2.} = 67$

$Y_{1.} = 511$ $Y_{2.} = 469$

Compute the following values:

✓ a. $\sum_j e^2_{1j}$ = 96 ✓ b. $\sum_j e^2_{2j}$ = 112

✓ c. $\sum_j e^2_{1j} + \sum_j e^2_{2j}$ = 208

x d. $X_{ij} = \mu + e_{ij}$ (in table) ✓ e. Σx^2_{ij} = 208 ($x_{ij} = X_{ij} - \bar{X}..$)

x f. $Y_{ij} = \mu + \tau_i + e_{ij}$ (in table)

g. $\Sigma y^2_{1j} + \Sigma y^2_{2j}$ = $96 + 112 = 208$

h. Treatment sum of squares from X_{ij}'s = $\frac{\Sigma X_{i.}^2}{n_i} - \frac{X_{..}^2}{N} = \frac{490^2 + 490^2}{7} - \frac{980^2}{14} = 0$

i. Treatment sum of squares from Y_{ij}'s = $\Sigma Y_{i.}^2/n_i - Y_{..}^2/N = \frac{511^2 + 469^2}{7} - \frac{980^2}{14} = 126$

j. $n\Sigma\tau_i^2 = 7[(-3)^2 + (3^2)] = 126$

k. Did this exercise help to clarify some of the relationships among the values computed in a statistical analysis? How?

Relationship between τ_i's and e_{ij}'s.

LINMODEL.512