Analisis Residual

dan

Estimasi Parameter

Estimasi Parameter Model

$$y_{ijk} = \mu + \tau_i + \beta_j + (\tau\beta)_{ij} + \varepsilon_{ijk}$$

Bentuk

$$L = \sum_{i}^{a}\sum_{j}^{b}\sum_{k}^{n} e_{ijk}^2$$

$$= \sum_{i}^{a}\sum_{j}^{b}\sum_{k}^{n} \left(y_{ijk} - \mu - \tau_i - \beta_j - (\tau\beta)_{ij}\right)^2$$

Tentukan $\frac{\partial L}{\partial \mu}, \frac{\partial L}{\partial \tau}, \frac{\partial L}{\partial \beta}, \frac{\partial L}{\partial \tau\beta}$ untuk menentukan

$$\hat{\mu}, \quad \hat{\tau}_i, \quad \hat{\beta}_j, \quad (\hat{\tau}\beta)_{ij}$$

$$\hat{\mu} = \bar{y}_{\bullet\bullet\bullet}$$

$$\hat{\tau}_i = \bar{y}_{i\bullet\bullet} - \bar{y}_{\bullet\bullet\bullet}$$

$$\hat{\beta}_j = \bar{y}_{\bullet j\bullet} - \bar{y}_{\bullet\bullet\bullet}$$

$$(\hat{\tau}\beta)_{ij} = \bar{y}_{ij\bullet} - \bar{y}_{i\bullet\bullet} - \bar{y}_{\bullet j\bullet} + \bar{y}_{\bullet\bullet\bullet}$$

jadi

$$\hat{y}_{ijk} = \mu + \hat{\tau}_i + \hat{\beta}_j + (\hat{\tau}\beta)_{ij}$$

$$\hat{y}_{ijk} = \bar{y}_{ij\bullet}$$

Residual …

$$e_{ijk} = y_{ijk} - \hat{y}_{ijk}$$

$$= y_{ijk} - \bar{y}_{ij\bullet}$$

Contoh: prestasi vs model & aktivitas

Model Pembelajaran (A)	AKTIVITAS belajar matematika SISWA (B)		
	Tinggi (b_1)	Sedang (b_2)	Rendah (b_3)
LC5E (a_1)	100 96 96 88 88 84 72	96 92 88 88 88 84 80 80 76 76 76 76 76	76 72 72 68 68 64 64 60 60 60
Konvensional (a_2)	92 88 88 84 80 80 76	84 84 80 80 80 76 72 72 72 72 68 68 68 68 68 62	84 76 76 64 68 68 64 64 56

$$\hat{\mu} = \bar{y}_{\bullet\bullet\bullet} = 77.42934$$

$$\hat{\tau}_i = \bar{y}_{i\bullet\bullet} - \bar{y}_{\bullet\bullet\bullet} \Rightarrow \hat{\tau}_1, \hat{\tau}_2, \hat{\tau}_3 \, ?$$

$$\hat{\beta}_j = \bar{y}_{\bullet j\bullet} - \bar{y}_{\bullet\bullet\bullet} \Rightarrow \hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3 \, ?$$

$$(\hat{\tau}\beta)_{ij} = \bar{y}_{ij\bullet} - \bar{y}_{i\bullet\bullet} - \bar{y}_{\bullet j\bullet} + \bar{y}_{\bullet\bullet\bullet}$$

	T	S	R
LC5E	89.1429	82.76923	66.4
	(7)	(13)	(10)
Konvensional	84	73.375	68.88889
	(7)	(16)	(9)
Total	173.1429	156.1442	135.2889
	(14)	(29)	(19)
rataan	86.57145	78.07212	67.64445

residual

y_{ijk}	Mod	Akt	$\bar{y}_{ij\bullet}$	Res	y_{ijk}	Mod	Akt	$\bar{y}_{ij\bullet}$	Res
100	1	1	89.1429	10.8571	80	2	1	84	-4
88	1	1	89.1429	-1.1429	88	2	1	84	4
96	1	1	89.1429	6.8571	80	2	1	84	-4
84	1	1	89.1429	-5.1429	88	2	1	84	4
96	1	1	89.1429	6.8571	76	2	1	84	-8
72	1	1	89.1429	-17.1429	84	2	1	84	0
88	1	1	89.1429	-1.1429	84	2	2	73.375	10.625
96	1	2	82.76923	13.23077	80	2	2	73.375	6.625
88	1	2	82.76923	5.23077	72	2	2	73.375	-1.375
76	1	2	82.76923	-6.76923	68	2	2	73.375	-5.375
76	1	2	82.76923	-6.76923	84	2	2	73.375	10.625
92	1	2	82.76923	9.23077	76	2	2	73.375	2.625
84	1	2	82.76923	1.23077	72	2	2	73.375	-1.375
76	1	2	82.76923	-6.76923	68	2	2	73.375	-5.375
88	1	2	82.76923	5.23077	80	2	2	73.375	6.625
80	1	2	82.76923	-2.76923	72	2	2	73.375	-1.375
76	1	2	82.76923	-6.76923	68	2	2	73.375	-5.375
88	1	2	82.76923	5.23077	68	2	2	73.375	-5.375
80	1	2	82.76923	-2.76923	80	2	2	73.375	6.625
76	1	2	82.76923	-6.76923	72	2	2	73.375	-1.375
76	1	3	66.4	9.6	68	2	2	73.375	-5.375
68	1	3	66.4	1.6	62	2	2	73.375	-11.375