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No ....
Date

MPC *R10

[Cluster Random Sampling]

Pendugaan Rataan Populasi (μ)

$$\bar{y} = \frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} m_i}$$

* Jika $\bar{M}$ tidak dpt diketahui $\bar{M}$ diduga

$$\bar{m} = \frac{\sum^{n} m_i}{n}$$

$$\hat{V}(\bar{y}) = \left[\frac{N-n}{Nn\bar{M}^2}\right] \frac{\sum^{n} (y_i - \bar{y} m_i)^2}{n-1}$$

* $\sum^{n} (y_i - \bar{y} m_i)^2$

$$= \sum y_i^2 - 2\bar{y} \sum y_i m_i + \bar{y}^2 \sum m_i^2$$

$$BoE = 2\sqrt{\hat{V}(\bar{y})}$$

$$SK = \bar{y} \pm BoE$$

Penduga Total Populasi (τ)

* Jika M diketahui

$$\tau = M . \mu$$

$$\hat{\tau} = M . \bar{y}$$

$$\hat{\tau} = M . \frac{\sum^{n} y_i}{\sum^{n} m_i}$$

$$\hat{V}(\hat{\tau}) = \hat{V}(M\bar{y})$$

$$= N^2 \left[\frac{N-n}{Nn}\right] \frac{\sum^{n} (y_i - \bar{y} m_i)^2}{n-1}$$

$$M = N . m$$

$$\hat{V}(M\bar{y}) = M^2 \, V(\bar{y})$$

* Jika M tidak diketahui

$$\hat{\tau} = N . \bar{y}_t = \frac{N}{n} \sum^{n} y_i = N \frac{\sum^{n} y_i}{n}$$

$$\hat{V}(\hat{\tau}) = N^2 \left[\frac{N-n}{Nn}\right] \frac{\sum^{n} (y_i - \bar{y}_t)^2}{n-1}$$

Ukuran Gerombol Sama

↳ perbandingan dengan PCAS

* Penduga bagi μ :

$$\bar{y}_c = \frac{\sum^{n} y_i}{\sum^{n} m_i} = \frac{\sum^{n} y_i}{n.m}$$

$$\hat{V}(\bar{y}_c) = \left[\frac{1-n}{N}\right] \frac{1}{n.m} \, KTaG$$

kuadrat tengah antar gerombol

$$= \left[\frac{1-n}{N}\right] \left[\frac{1}{nm^2}\right] \left[\frac{1}{n-1}\right] \left[\sum_{i=1}^{n} (y_i - \bar{y}_t)^2\right]$$

$$\bar{y}_t = \frac{\sum^{n} y_i}{n} = m . \bar{\bar{y}}_c$$

One-Way ANOVA

kesimpulan ---- ada 2 keragaman

1. keragaman antargrup, JKB = SSB atau keragaman karena faktor
2. keragaman dalam grup, JKG = SSE atau keragaman yg tidak dapat diterangkan o/ faktor maka disebut keragaman galat

Tabel Sidik Ragam

SK	dB	JK	KT
antar group	$n-1$	JK B	KTB
dalam group	$n(m-1)$	JKG	KTG
total	$nm-1$	JKT	

$p = n$, $r = m$

No
Date

Efisiensi Relatif PCAG Vs PCAS

$$RE\left(\frac{\bar{y}_c}{\bar{y}}\right) = \frac{\hat{S}^2}{KTB}$$

$$\hat{S}^2 = \frac{N(m-1)\,KTG + (N-1)\,KTB}{Nm-1}$$

$$\approx \frac{1}{m}\left[(m-1)KTG + KTB\right]$$

Contoh:
$RE\left(\frac{\bar{y}_c}{\bar{y}}\right) = 3$, artinya PCAG lebih efektif 3x drpd PCAS

* dlm penerapan orang lebih suka PCAG walaupun RE nya mendekati 1 karena:
  1. lebih praktis (tdk perlu frame)
  2. murah

  tetapi sample dalam PCAG lebih banyak, c/ Quick count

Penentuan Ukuran Contoh

$B = Z_{\alpha/2}\sqrt{\hat{V}(\bar{y})}$

$$n = \frac{N\cdot\sigma_c^2}{\frac{N\cdot B^2\bar{M}^2}{z^2} + \sigma_c^2}$$

$S_c^2 = \frac{\sum^n (y_i - \bar{y}m_i)^2}{n'-1}$ → u/ duga σ_c^2

* nilai σ_c^2 dan M ~~diduga~~ ditentukan dari informasi awal atau survey terdahulu dgn mengambil contoh awal berukuran n

Untuk ukuran contoh μ:

$$n = \frac{N\sigma_c^2}{\frac{NB^2\bar{M}^2}{4} + \sigma_c^2} \qquad S_c^2 = \frac{\sum^n (y_i - \bar{y}m_i)^2}{n-1}$$

Ukuran contoh τ:

$$n = \frac{N\sigma_c^2}{\frac{N\cdot B^2}{4N^2} + \sigma_c^2}$$

S_c^2 jika M diket, σ_c^2 diduga:

$$S_c^2 = \frac{\sum^n (y_i - \bar{y}m_i)}{n-1}$$

$$= \frac{\sum y_i^2 - 2\bar{y}\sum y_i\cdot m_i + \bar{y}^2\sum m_i^2}{n-1}$$

S_c^2 jika M tidak diketahui:

$$S_c^2 = \frac{\sum^n (y_i - \bar{y})^2}{n-1}$$

↳ rumus S_y di kalkulator

Ukuran contoh proporsi:

$$n = \frac{N\sigma_p^2}{ND + \sigma_p^2} \qquad D = \frac{B^2\bar{M}^2}{4} = \frac{B^2\bar{m}^2}{4}$$

σ_p^2 diduga $S_p^2 = \frac{\sum^n (a_i - \hat{p}m_i)^2}{n-1}$

Pendugaan Proporsi Populasi ($\hat{p}$)

a_i = yg setuju dlm cluster ke-i
m_i = elemen dlm cluster ke-i

$$\hat{p} = \frac{\sum^n a_i}{\sum m_i}$$

$$\sum^n (a_i - \hat{p}m_i)^2 = \sum a_i^2 - 2\hat{p}\sum a_i m_i + \hat{p}^2\sum m_i^2$$

$$\hat{V}(\hat{p}) = \left[\frac{N-n}{Nn\bar{M}^2}\right]\frac{\sum^n (a_i - \hat{p}m_i)^2}{n-1}$$