

Momen, Kemiringan & Kurtosis

MomenT

Ukuran lain dari rata-rata & varians

$$m_r = \frac{\sum (x_i - \bar{x})^r}{n}$$

Cara Coding:

$$m_r' = p^r \left(\frac{\sum f_i c_i^r}{n} \right)$$

Data berdistribusi frekuensi

$$m_r = \frac{\sum f_i (x_i - \bar{x})^r}{n}$$

Harga m_r ditentukan berdasarkan hubungan:

$$m_2 = m_2' - (m_1')^2$$

$$m_3 = m_3' - 3m_1'm_2' + 2(m_1')^3$$

$$m_4 = m_4' - 4m_1'm_3' + 6(m_1')^2 m_2' - 3(m_1')^4$$

Contoh:

Perhatikan daftar distribusi frekuensi berikut!

Daata	Frekuensi (f)
60 – 62	5
63 – 65	18
66 – 68	42
69 – 71	27
72 – 74	8
Jumlah	100

Hitunglah empat buah moment sekitar rata-rata!

Cara Coding

$$m_r' = p^r \left(\frac{\sum f_i c_i^r}{n} \right)$$

Daata	f_i	c_i	$f_i c_i$	$f_i c_i^2$	$f_i c_i^3$	$f_i c_i^4$
60 – 62	5	-2	-10	20	-40	80
63 – 65	18	-1	-18	18	-18	18
66 – 68	42	0	0	0	0	0
69 – 71	27	1	27	27	27	27
72 – 74	8	2	16	32	64	128
Jumlah	100	-	15	97	33	253

$$m_1' = p^1 \left(\frac{\sum f_i c_i^1}{n} \right) = 3 \left(\frac{15}{100} \right) = 0,45$$

$$m_2' = p^2 \left(\frac{\sum f_i c_i^2}{n} \right) = 3^2 \left(\frac{97}{100} \right) = 8,73$$

$$m_3' = p^3 \left(\frac{\sum f_i c_i^3}{n} \right) = 3^3 \left(\frac{33}{100} \right) = 8,91$$

$$m_4' = p^4 \left(\frac{\sum f_i c_i^4}{n} \right) = 3^4 \left(\frac{253}{100} \right) = 204,93$$

$$m_2 = m_2' - (m_1')^2 = 8,73 - (0,45)^2 = 8,53$$

$$m_3 = m_3' - 3m_1' m_2' + 2(m_1')^3 = 8,91 - 3(0,45)(8,73) + 2(0,45)^3 = -2,69$$

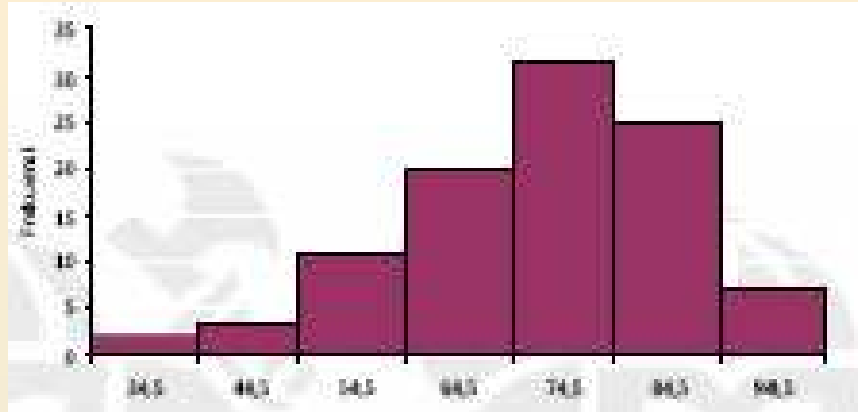
$$\begin{aligned} m_4 &= m_4' - 4m_1' m_3' + 6(m_1')^2 m_2' - 3(m_1')^4 \\ &= 204,93 - 4(0,45)(8,91) + 6(0,45)^2 8,73 - 3(0,45)^4 = 199,38 \end{aligned}$$

Kemiringan

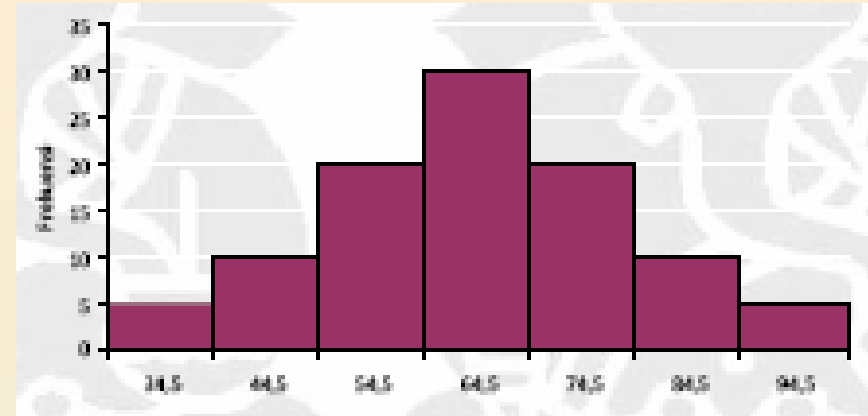
Menunjukkan ukuran kesimetrisan distribusi frekuensi

Bentuk

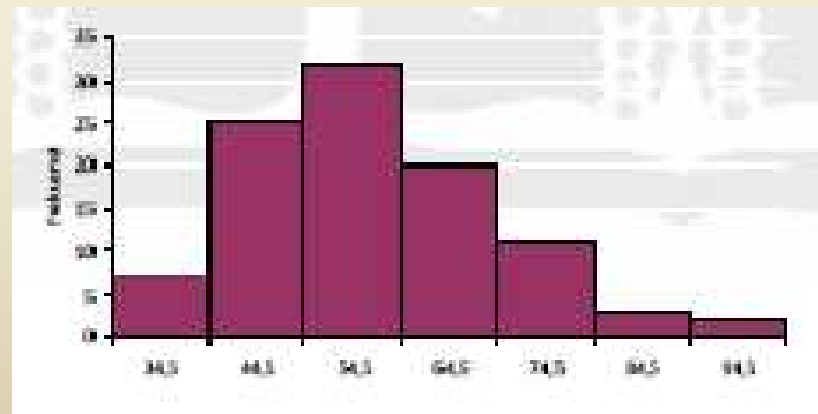
- Kemiringan negatif (kiri)
- Kemiringan nol (simetris)
- Kemiringan positif (kanan)



Kemiringan negatif (kiri)



Kemiringan nol (simetris)



Kemiringan positif (kanan)

Ukuran Kemiringan

$$\text{Kemiringan} = \frac{\text{Rata - rata} - \text{Modus}}{\text{Simpangan baku}}$$

$$\text{Kemiringan} = \frac{3(\text{Rata - rata} - \text{Median})}{\text{Simpangan baku}}$$

Koefisien kemiringan Pearson

Cat: **Jika Kemiringan (+), model (+)**
 Jika Kemiringan (-), model (-)
 Jika Kemiringan nol, model simetris

Kurtosis

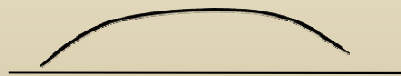
- Ukuran keruncingan
- Ukuran ekkses dari suatu distribusi
- Ukuran distorsi terhadap kurva normal

Bentuk Kurtosis

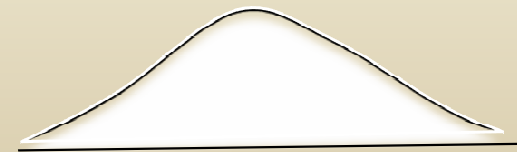
- Leptokurtis (leptokurtic)
- Platikurtik (platykurtic)
- Mesokurtik (mesokurtic) → **Bentuk kurva normal**



Leptokurtis



Platikurtis



Mesokurtis

Koefisien kurtosis

Ukuran kurtosis

ditentukan

$$a_4 = \frac{m_4}{m_2^2}$$

kriteria

$a_4 > 3$ → leptokurtik

$a_4 = 3$ → normal

$a_4 < 3$ → platikurtik

Koefisien Kurtosis Persentil

$$k = \frac{SK}{P_{90} - P_{10}} = \frac{\frac{1}{2}(K_3 - K_1)}{P_{90} - P_{10}}$$

SK = rentang semi antar kuartil

K1 = kuartil kesatu

K3 = kuartil ketiga

P10 = persentil kesepuluh

P90 = persentil ke-90

P90-P10 = rentang 10-90 persentil

Model distribusi normal k = 0,263