Aufgabenblatt 6

Aufgabe 1

$$s_y^2 = \frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2 \qquad \text{einsetzen}$$

$$= \frac{1}{n}\sum_{i=1}^{n}(\alpha + \beta x_i - (\alpha + \beta \bar{x}))^2$$

$$= \frac{1}{n}\sum_{i=1}^{n}(\alpha + \beta x_i - \alpha - \beta \bar{x})^2$$

$$= \frac{1}{n}\sum_{i=1}^{n}(\beta x_i - \beta \bar{x})^2$$

$$= \frac{1}{n}\beta^2 \sum_{i=1}^{n}(x_i - \bar{x})^2$$

$$= \beta^2 s_x^2$$

für x: $s_x^2 = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$

Aufgabe 2

$$s^2 = \frac{1}{n}\sum_{i=1}^{n} x_i^2 - \bar{x}^2$$

$$s^2 := \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2 \quad \neq \text{bin. Formel}$$

$$= \frac{1}{n}\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\sum_{i=1}^{n} 2 x_i \bar{x} + \frac{1}{n}\sum_{i=1}^{n} \bar{x}^2$$

$$= \frac{1}{n}\sum_{i=1}^{n} x_i^2 - 2 \cdot \frac{1}{n} \cdot \bar{x} \cdot \sum_{i=1}^{n} x_i + \frac{1}{n} \cdot n \cdot \bar{x}^2$$

$$= \frac{1}{n}\sum_{i=1}^{n} x_i^2 - 2 \cdot \bar{x} \cdot \bar{x} + \bar{x}^2$$

$$= \frac{1}{n} \sum_{j=1}^{n} x_j^2 - \bar{x}^2 //$$

Aufgabe 3 Zentrierter Parameter

$$\theta_K^* = \theta_K^r - 3$$ rel. Kurtosisparameter

$$\theta_K^r = \frac{\theta_K}{s^4}$$ abs. Kurtosisp.
s^4 = quadrierte Varianz

$$\theta_K = \frac{1}{n} \sum_{j=1}^{n} (x_j - \bar{x})^4$$

1. Schritt $\bar{x} = 6{,}25$

$$\theta_K = \frac{1}{20} \left((9 - 6{,}25)^4 + (7 - 6{,}25)^4 + \ldots + (5 - 6{,}25)^4 \right)$$

$$= 7{,}68203 \approx 7{,}682$$

2. Schritt

$$s^2 = 1{,}7875 ; \; s^4 = 3{,}1952$$

$$\theta_K^r = \frac{7{,}6820}{3{,}1952} = 2{,}4042$$

3. Smith

$$\theta_k^N = \theta_{12}^r - 3 = 2,4042 - 3 = -0,5958$$

Aufgabe 4 $\quad \bar{x} = 6{,}55$

Schritt 1

$$\theta_{1,2} = 0{,}3(5-6{,}55)^4 + 0{,}25(6-6{,}55)^4 + 0{,}15(7-6{,}55)^4 + 0{,}2(8-6{,}55)^4 + 0{,}1(9-6{,}55)^4$$

$$= 6{,}2477$$

2. Schritt

$s^2 = 1{,}8475$; $s^4 = 3{,}413$

$$\theta_{1,2}^{N} = \frac{6{,}2477}{3{,}413} = 1{,}8304$$

3. Schritt

$$\theta_{1,2}^{N} = 1{,}8304 - 3 = -1{,}1696$$