

# UJI UNTUK DISTRIBUSI NORMAL

Th.12.3.1  $X \sim N(\mu, \sigma^2)$ ,  $\sigma^2$  diketahui

$$H_0 : \mu \leq \mu_0$$

$$H_1 : \mu > \mu_0$$

Pada tingkat signifikansi  $\alpha$ , uji akan menolak  $H_0$  jika

$$Z_0 \geq Z_{1-\alpha}$$

$$Z_0 = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} \geq Z_{1-\alpha}$$

Jadi  $\pi(\mu)$

$$\pi(\mu) = P \left[ \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} \geq Z_{1-\alpha} \mid \mu \right]$$

$$= P \left[ \frac{\bar{x} - \mu_0 + \mu - \mu}{\sigma / \sqrt{n}} \geq Z_{1-\alpha} \right]$$

$$= P \left[ \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} - \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \geq Z_{1-\alpha} \right] = P \left[ \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} \geq Z_{1-\alpha} + \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \right] = 1 - \Phi \left[ Z_{1-\alpha} + \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \right]$$

$X \sim N(\mu, \sigma^2), \sigma^2$  diketahui

$H_0 : \mu \geq \mu_0$

$H_1 : \mu < \mu_0$

Pada tingkat signifikansi  $\alpha$ , uji akan menolak  $H_0$  jika

$$Z_0 \leq -Z_{1-\alpha}$$

$$Z_0 = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} \geq -Z_{1-\alpha}$$

Jadi  $\pi(\mu)$

$$\pi(\mu) = P \left[ \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} \leq -Z_{1-\alpha} \mid \mu \right]$$

$$= P \left[ \frac{\bar{x} - \mu_0 + \mu - \mu}{\sigma / \sqrt{n}} \geq -Z_{1-\alpha} \right]$$

$$= P \left[ \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} - \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \geq -Z_{1-\alpha} \right] = P \left[ \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} \geq -Z_{1-\alpha} + \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \right] = 1 - \Phi \left[ -Z_{1-\alpha} + \frac{\mu_0 - \mu}{\sigma / \sqrt{n}} \right]$$

$X \sim N(\mu, \sigma^2)$ ,  $\sigma^2$  tidak diketahui

$$H_0 : \mu \leq \mu_0$$

$$H_1 : \mu > \mu_0$$

Pada tingkat signifikansi  $\alpha$ , uji akan menolak  $H_0$  jika

$$t_0 \geq t_{1-\alpha}(n-1)$$

$$t_0 = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} \geq t_{1-\alpha}(n-1)$$

Jadi  $\pi(\mu)$

$$\pi(\mu) = P\left[\frac{\bar{x} - \mu_0}{s/\sqrt{n}} \geq t_{1-\alpha}(v) \mid \mu\right], v = n-1$$

$$= P\left[\frac{\bar{x} - \mu_0 + \mu - \mu}{s/\sqrt{n}} \geq t_{1-\alpha}(v)\right]$$

$$= P\left[\frac{\bar{x} - \mu - (\mu - \mu_0)}{s/\sqrt{n}} \geq t_{1-\alpha}(v)\right] = P\left[\frac{Z + \delta}{\sqrt{V/v}} \geq t_{1-\alpha}(v)\right], \quad \delta = \frac{(\mu - \mu_0)}{s/\sqrt{n}}$$

### Th. 12.3.3 Uji untuk Variansi

$$X_i \sim N(\mu, \sigma^2)$$

$$\text{misalkan } v_0 = \frac{(n-1)s^2}{\sigma_0^2}$$

$$H_0 : \sigma^2 \leq \sigma_0^2$$

$$H_1 : \sigma^2 > \sigma_0^2$$

Pada tingkat signifikansi  $\alpha$ , uji akan menolak  $H_0$  jika

$$v_0 \geq \chi_{1-\alpha}^2 (n-1)$$

$$\pi(\sigma^2) = P[v_0 \geq \chi_{1-\alpha}^2 (n-1) | \sigma^2]$$

$$= P\left[\frac{(n-1)s^2}{\sigma_0^2} \geq \chi_{1-\alpha}^2 (n-1) | \sigma^2\right]$$

$$= P\left[\frac{(n-1)s^2}{\sigma_0^2} \geq \frac{\sigma^2}{\sigma_0^2} \chi_{1-\alpha}^2 (n-1)\right]$$

$$= P\left[\frac{(n-1)s^2}{\sigma^2} \geq \frac{\sigma_0^2}{\sigma^2} \chi_{1-\alpha}^2 (n-1)\right]$$

$$= 1 - H\left[\frac{\sigma_0^2}{\sigma^2} \chi_{1-\alpha}^2 (n-1)\right]$$

Kerjakan soal  
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## Th. 12.3.4. Uji untuk dua sampel

$$X_i \sim N(\mu_1, \sigma_1^2), \quad Y_i \sim N(\mu_2, \sigma_2^2)$$

misalkan  $f_0 = \frac{s_1^2}{s_2^2}$

$$H_0 : \frac{\sigma_2^2}{\sigma_1^2} \leq d_0$$

$$H_1 : \frac{\sigma_2^2}{\sigma_1^2} > d_0$$

Pada tingkat signifikansi  $\alpha$ , uji akan menolak  $H_0$  jika

$$f_0 \leq \frac{1}{f_{1-\alpha}(n_2-1, n_1-1)}$$

Pelajari juga Th. 12.3.5

## 12.4 Uji Binomial

$$X_i \sim \text{BIN}(1, p), \quad i = 1, \dots, n$$

$$\sum_{i=1}^n X_i \sim \text{BIN}(n, p)$$

Th.12.4.1

1.  $H_0 : p \leq p_0$

$$H_1 : p > p_0$$

Tolak  $H_0$  jika

$$Z_0 = \frac{s - np_0}{\sqrt{np_0(1 - p_0)}} > Z_{1-\alpha}$$

2.  $H_0 : p \geq p_0$

$$H_1 : p < p_0$$

Tolak  $H_0$  jika

$$Z_0 = \frac{s - np_0}{\sqrt{np_0(1 - p_0)}} < -Z_{1-\alpha}$$

3.  $H_0 : p = p_0$

$$H_1 : p \neq p_0$$

Tolak  $H_0$  jika

$$Z_0 = \frac{s - np_0}{\sqrt{np_0(1 - p_0)}} > Z_{1-\frac{\alpha}{2}} \quad \text{atau} \quad Z_0 = \frac{s - np_0}{\sqrt{np_0(1 - p_0)}} < -Z_{1-\frac{\alpha}{2}}$$

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# Uji POISSON

$$X_i \sim POI(\mu), \quad i=1, \dots, n$$

$$S = \sum_{i=1}^n X_i$$

1.  $H_0 : \mu \leq \mu_0$

$$H_1 : \mu > \mu_0$$

Tolak  $H_0$  jika

$$1 - F(s-1, n\mu_0) \leq \alpha \quad \text{atau} \quad 2n\mu_0 \leq \chi_{1-\alpha}^2(2s)$$

2.  $H_0 : \mu \geq \mu_0$

$$H_1 : \mu < \mu_0$$

Tolak  $H_0$  jika

$$F(s-1, n\mu_0) \leq \alpha \quad \text{atau} \quad 2n\mu_0 \geq \chi_{1-\alpha}^2(2s)$$

3.  $H_0 : \mu = \mu_0$

$$H_1 : \mu \neq \mu_0$$

Tolak  $H_0$  jika

$$2n\mu_0 \geq \chi_{1-\frac{\alpha}{2}}^2(2s+2) \quad \text{atau} \quad 2n\mu_0 \leq \chi_{\frac{\alpha}{2}}^2(2s)$$

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# MOST POWERFUL TEST

## ► Definisi 12.6.1

$$H_0 : \theta = \theta_0$$

$$H_1 : \theta = \theta_1$$

Berdasarkan  $C^*$  dapat dikatakan MPT dengan ukuran  $\alpha$  jika

$$a. \pi_{C^*}(\theta_0) = \alpha$$

$$b. \pi_{C^*}(\theta_1) \geq \pi_C(\theta_1)$$

Lemma Neyman Person

$$X_i \sim f(x_1, \dots, x_n, \theta)$$

$$\lambda(x_1, \dots, x_n; \theta_0, \theta_1) = \frac{f(x_1, \dots, x_n; \theta_0)}{f(x_1, \dots, x_n; \theta_1)}$$

dan

$$C^* = \{(x_1, \dots, x_n) \mid \lambda(x_1, \dots, x_n; \theta_0, \theta_1) \leq k\}, k = \text{konstanta}$$

∋

$$P[(x_1, \dots, x_n) \in C^* \mid \theta_0] = \alpha$$

Contoh soal

$$X_i \sim EXP(\theta)$$

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