21.02.

СЕМ лекция

$$L_0(x) = (\sqrt{2\pi}\sigma)^{-n} e^{-\sum_{j=1}^{n} \frac{(x_j-\mu_1)^2}{2\sigma^2}}$$

⊕ $X \in N(\mu; \sigma^2)$ σ^2 е известно $H_0: \mu = \mu_0$ α

$\mu_1 > \mu_0$

$H_1: \mu = \mu_1$

$$x \in \mathbb{R}^n : L_1(x) \geq K L_0(x) \} = \left\{ x \in \mathbb{R}^n : \frac{-\sum_{j=1}^{n}(x_j-\mu_1)^2}{2\sigma^2} \geq K - \sum_{j=1}^{n} \frac{(x_j-\mu_0)^2}{2\sigma^2} \right\} =$$

$$= x \in \mathbb{R}^n : \frac{-\sum_{j=1}^{n} x_j^2}{2\sigma^2} + \frac{1}{\sigma^2}\mu_1 \sum_{j=1}^{n} x_j - \frac{n\mu_1^2}{2\sigma^2} \geq \ln K - \frac{\sum_{j=1}^{n}}{}$$

$=$

$$K_2 = \frac{K_1 \sigma^2}{\mu_1 - \mu_0}$$

$$= \left\{ x \in \mathbb{R}^n : \bar{x} \geq \frac{K_2}{n} \right\} = \left\{ x \in \mathbb{R}^n : \frac{\bar{x} - \mu_0}{\sigma/\cancel{\sqrt{n}}} = \frac{K_2}{\sigma\sqrt{n}} \right\} =$$

$$= \left\{ x \in \mathbb{R}^n : \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} \right\}$$

$$W = \{ x \in \mathbb{R}^n \; L_1(x) \geq K L_0(x) \} = \left\{ x \in \mathbb{R}^n : \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} \geq K_3 \right\}$$

$$\alpha = \mathbb{P}(\vec{x} \in W / H_0) = \mathbb{P}(L_1(\vec{x}) \geq K L_0(\vec{x}) \mid H_0) =$$

$$= \mathbb{P}\left(\frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} \geq K_3 \mid H_0 \right) = \mathbb{P}(Z \geq K_3) \qquad \bar{X} = \frac{\sum_{j=1}^{n} x_j}{n}$$

$$K_3 = q_{1-\alpha}$$

$$\left\{ \bar{X} \geq \mu_0 + q_{1-\alpha} \frac{\sigma}{\sqrt{n}} \right\}$$