

μ

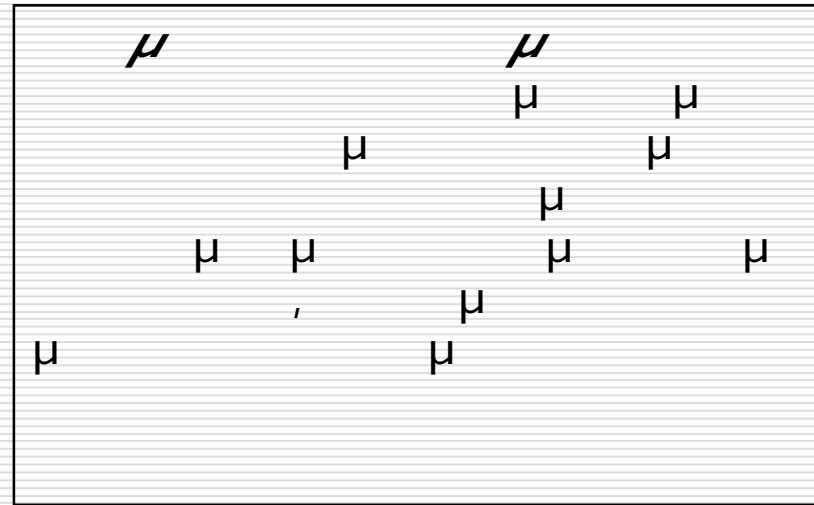
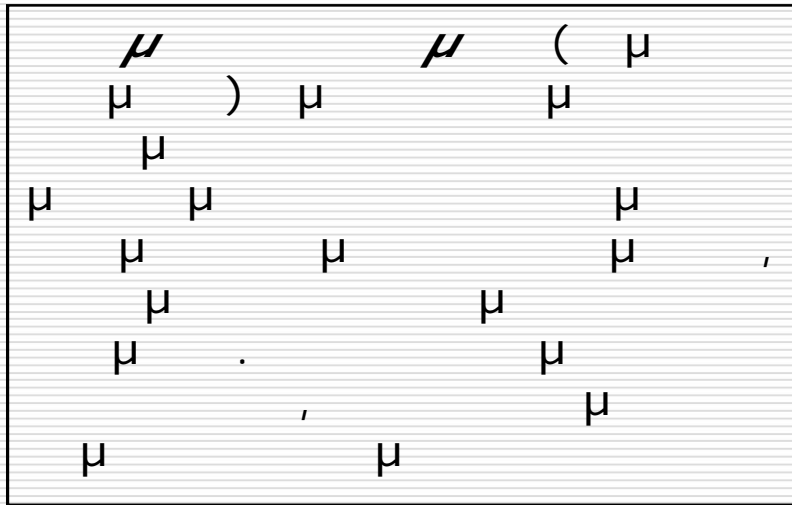
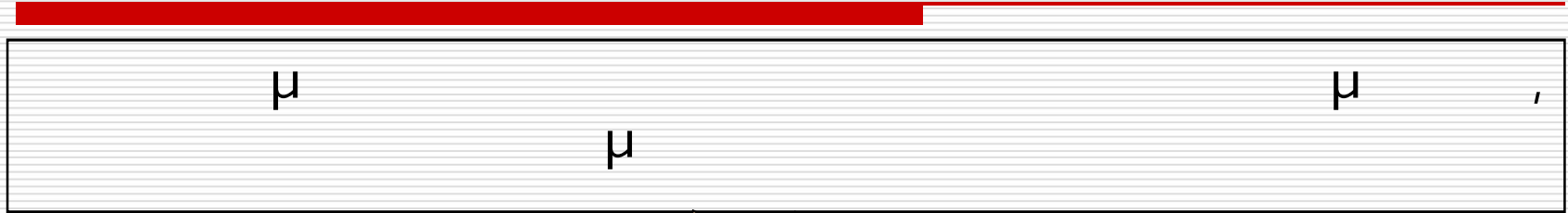


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μ μ (Point Estimators)

μ μ μ ^{μ} μ μ ^{μ} :

- 1.
- 2.
- 3.

(Method of Moments)

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k

$$\mu_k = \sum_X X^k P(X = x)$$

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k

$$m_k = \frac{1}{n} \sum_{i=1}^n X_i^k$$



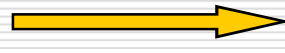
μ μ - μ μ μ μ μ
μ μ . μ μ μ μ μ μ μ

1. μ
2. μ
- 3.
- 4.



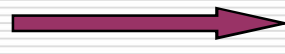
μ μ μ

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 μ (μ)

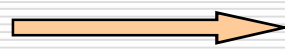
$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

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 (p) 

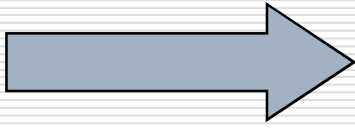
$$\hat{p} = \frac{n_A}{n}$$

○

 (s^2) 

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





$$V(\bar{X}) = \frac{s^2}{n}$$

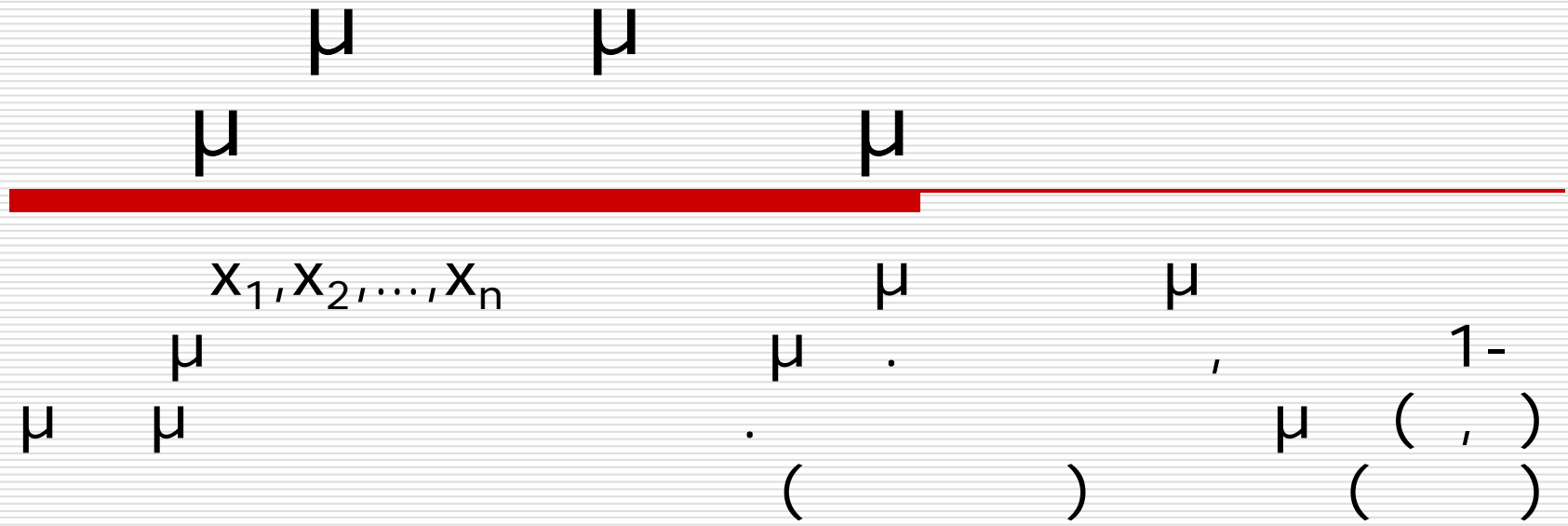
$$V(\hat{p}) = \frac{\hat{p}(1 - \hat{p})}{n}$$

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$$P(\mu - z_{1-\alpha/2} \leq \bar{x} \leq \mu + z_{1-\alpha/2}) = 1 - \alpha$$

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 μ μ μ $($ μ $)$ μ μ
 μ μ n 30

$$A = \bar{X} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$\Delta = \bar{X} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

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$$\mu \quad \mu \quad \mu \quad \mu \quad \mu \quad \mu$$

$$\mu \quad \mu \quad \mu \quad \left(\quad \right) \quad \mu \quad \mu$$

$$\mu \quad \mu \quad n \quad 30$$

$$A = \bar{X} - Z_{\alpha/2} \frac{s}{\sqrt{n}}$$

$$\Delta = \bar{X} + Z_{\alpha/2} \frac{s}{\sqrt{n}}$$

μ μ μ μ μ μ
 μ μ μ $($ $)$ μ μ
 $n < 30$

$$A = \bar{X} - t_{n-1, a/2} \frac{s}{\sqrt{n}}$$

$$\Delta = \bar{X} + t_{n-1, a/2} \frac{s}{\sqrt{n}}$$

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μ μ μ
 μ μ μ . (μ
 , n & m 30)

$$A = (\bar{X} - \bar{Y}) - Z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n} + \frac{\sigma_2^2}{m}}$$

$$\Delta = (\bar{X} - \bar{Y}) + Z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n} + \frac{\sigma_2^2}{m}}$$

μ , μ μ

μ μ μ
 μ μ μ . (μ
 , n & $m < 30$)

$$A = (\bar{X} - \bar{Y}) - t_{n+m-2; \alpha/2} S_{pooled} \sqrt{\frac{1}{n} + \frac{1}{m}}$$

$$\Delta = (\bar{X} - \bar{Y}) + t_{n+m-2; \alpha/2} S_{pooled} \sqrt{\frac{1}{n} + \frac{1}{m}}$$

$$S_{pooled}^2 = \frac{(n-1)s_1^2 + (m-1)s_2^2}{n+m-2}$$

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$$A = \bar{z} - t_{n-1, a/2} \frac{s_z}{\sqrt{n}}$$

$$\Delta = \bar{z} + t_{n-1, a/2} \frac{s_z}{\sqrt{n}}$$

$n = 30,$ μ
 μ $z_{a/2}$ t μ μ

μ μ
 μ μ μ
 n 30

p

$$A = \hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\Delta = \hat{p} + z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

μ μ μ $p_1 -$
 $p_2,$ μ μ n 30 μ
 μ μ

$$A = \hat{p}_1 - \hat{p}_2 - z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n} + \frac{\hat{p}_2(1-\hat{p}_2)}{m}}$$

$$\Delta = \hat{p}_1 - \hat{p}_2 + z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n} + \frac{\hat{p}_2(1-\hat{p}_2)}{m}}$$

μ μ
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2

$$A = \frac{(n-1)s^2}{\chi^2_{n-1, a/2}}$$

$$\Delta = \frac{(n-1)s^2}{\chi^2_{n-1, 1-a/2}}$$

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μ μ

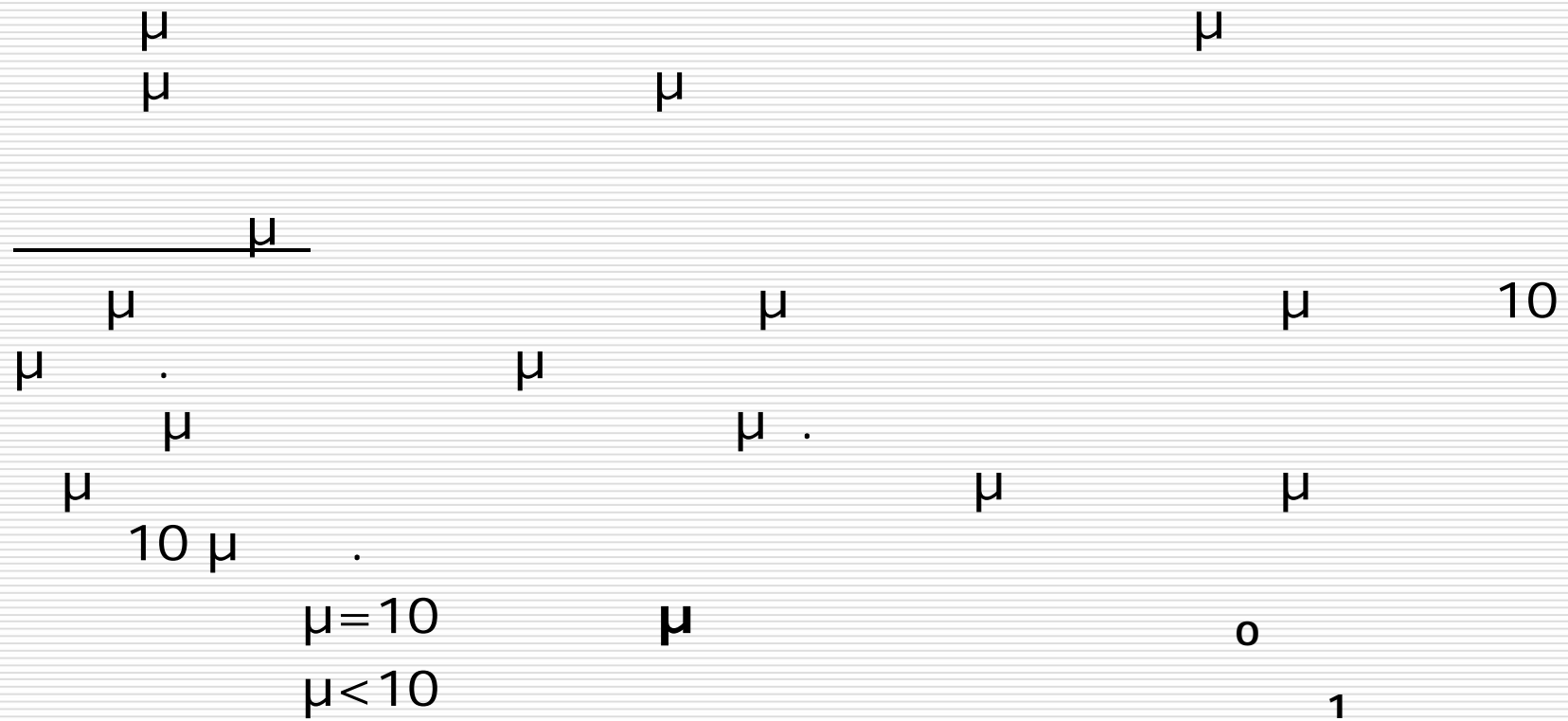
μ

$$\frac{\xi_1^2}{\xi_2^2} \frac{1}{F_{n-1, m-1, a/2}} < \frac{\sigma_1^2}{\sigma_2^2} < \frac{\xi_1^2}{\xi_2^2} F_{m-1, n-1, a/2}$$

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$$\mu_0 = \mu_0'$$

$$\mu_0 \quad \mu_0' \quad \mu_0''$$

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$$\begin{aligned} \mu &> \mu_0 \quad (\mu_0) \\ \mu &< \mu_0 \quad (\mu_0) \\ \mu &= \mu_0 \quad (\mu_0) \end{aligned}$$

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μ μ

a.

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μ_1 μ_2 μ_1 μ_2 μ_1 μ_2
 m & n 30 30

$H_0: \mu_1 - \mu_2 = \delta$ $H_1: \mu_1 - \mu_2 > \delta$	$H_0: \mu_1 - \mu_2 = \delta$ $H_1: \mu_1 - \mu_2 < \delta$	$H_0: \mu_1 - \mu_2 = \delta$ $H_1: \mu_1 - \mu_2 \neq \delta$
$R = \{z > z_a\}$	$R = \{z < -z_a\}$	$R = \{z > z_{a/2}\}$ $\{z < -z_{a/2}\}$

$$z = \frac{\bar{x} - \bar{y} - \delta}{\sqrt{\frac{\sigma_1^2}{n} + \frac{\sigma_2^2}{m}}}$$

$$z = \frac{\bar{x} - \bar{y} - \delta}{\sqrt{\frac{s_1^2}{n} + \frac{s_2^2}{m}}}$$

μ (μ) μ μ μ
 $m \ \& \ n < 30$

$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2 >$	$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2 <$	$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2$
$R = \{ t > t_{n+m-2, \alpha} \}$	$R = \{ t < -t_{n+m-2, \alpha} \}$	$R = \{ \{ t > t_{n+m-2, \alpha/2} \}$ $\{ t < -t_{n+m-2, \alpha/2} \} \}$

$$t = \frac{\bar{x} - \bar{y} - \delta}{\sqrt{\frac{(n-1)s_1^2 + (m-1)s_2^2}{n+m-2}} \sqrt{\frac{1}{n} + \frac{1}{m}}}$$

$$\mu \quad (\quad \mu \quad) \quad \mu \quad -$$

$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2 >$	$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2 <$	$H_0: \mu_1 - \mu_2 =$ $1: \mu_1 - \mu_2$
$R = \{ t > t_{n+m-2, \alpha} \}$	$R = \{ t < -t_{n+m-2, \alpha} \}$	$R = \{ \{ t > t_{n+m-2, \alpha/2} \}$ $\{ t < -t_{n+m-2, \alpha/2} \} \}$

$$t = \frac{\bar{z} - \delta}{\sqrt{\frac{s_z^2}{n}}}$$

: μ

$$\bar{z} = \frac{1}{n} \sum_{i=1}^n (x_i - y_i) = \frac{1}{n} \sum_{i=1}^n z_i$$

$$s_z^2 = \frac{1}{n-1} \sum_{i=1}^n (z_i - \bar{z})^2$$

μ

$H_0: p = p_0$ $H_1: p > p_0$	$H_0: p = p_0$ $H_1: p < p_0$	$H_0: p = p_0$ $H_1: p \neq p_0$
$R = \{z > z_a\}$	$R = \{z < -z_a\}$	$R = \{ \{z > z_{a/2}\} \cup \{z < -z_{a/2}\} \}$

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

$p_1 - p_2$ μ

$H_0: p_1 - p_2 =$ $1: p_1 - p_2 >$	$H_0: p_1 - p_2 =$ $1: p_1 - p_2 <$	$H_0: p_1 - p_2 =$ $1: p_1 - p_2$
$R = \{z > z_a\}$	$R = \{z < -z_a\}$	$R = \{\{z > z_{a/2}\}$ $\{z < -z_{a/2}\}\}$

$$z = \frac{\hat{p}_1 - \hat{p}_2 - \delta}{\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n} + \frac{\hat{p}_2(1-\hat{p}_2)}{m}}}$$

μ

$H_0: \sigma^2 = \sigma_0^2$ $H_1: \sigma^2 > \sigma_0^2$	$H_0: \sigma^2 = \sigma_0^2$ $H_1: \sigma^2 < \sigma_0^2$	$H_0: \sigma^2 = \sigma_0^2$ $H_1: \sigma^2 \neq \sigma_0^2$
$R = \{X^2 > \chi_{n-1, \alpha}^2\}$	$R = \{X^2 < \chi_{n-1, 1-\alpha}^2\}$	$R = \{\{X^2 > \chi_{n-1, \alpha/2}^2\}$ $\{X^2 < \chi_{n-1, 1-\alpha/2}^2\}\}$

$$X^2 = \frac{(n-1)s^2}{\sigma_0^2}$$

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μ

$$\begin{array}{lll} H_0 : \frac{\sigma_1^2}{\sigma_2^2} = 1 & & \\ H_0 : \frac{\sigma_1^2}{\sigma_2^2} > 1 & H_0 : \frac{\sigma_1^2}{\sigma_2^2} < 1 & H_0 : \frac{\sigma_1^2}{\sigma_2^2} \neq 1 \\ R = \{ F > F_{n_1, n_2; a} \} & R = \{ F > F_{n_1, n_2; a} \} & R = \{ F > F_{n_1, n_2; a/2} \} \\ F = \begin{cases} \frac{s_1^2}{s_2^2}, & s_1^2 > s_2^2 \\ \frac{s_1^2}{s_2^2}, & s_1^2 < s_2^2 \end{cases} \end{array}$$