

The background of the slide is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the slide, with a higher concentration in the top-left and bottom-right corners. The droplets have highlights and shadows, giving them a three-dimensional appearance.

# **FORMULAS CONTRASTES HIPOSTESIS**

The background of the slide is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the slide, with a higher concentration in the top-left and bottom-right corners. Each droplet has a highlight and a shadow, giving it a three-dimensional appearance.

# UNA MUESTRA

# Inferencia Estadística: Tests de hipótesis

Contrastes para una población Normal:

Contrastes sobre la **media**

**Varianza Conocida**

Estadístico de  
contraste

$$Z = \frac{\bar{X} - \mu_0}{\sigma_0 / \sqrt{n}} \rightarrow N(0, 1)$$

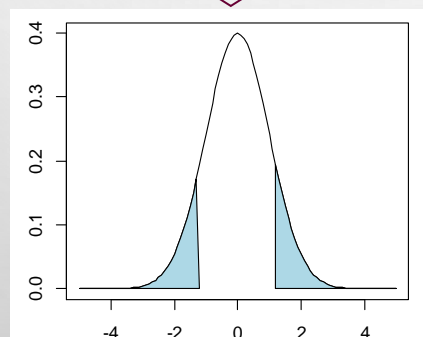
Hipótesis del  
test

$$H_0 : \mu = \mu_0$$
$$H_1 : \mu \neq \mu_0$$

$$H_0 : \mu \leq \mu_0$$
$$H_1 : \mu > \mu_0$$

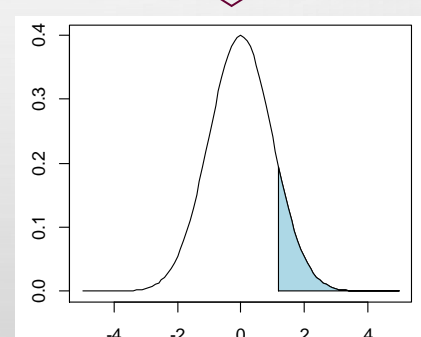
$$H_0 : \mu \geq \mu_0$$
$$H_1 : \mu < \mu_0$$

Criterio de  
rechazo

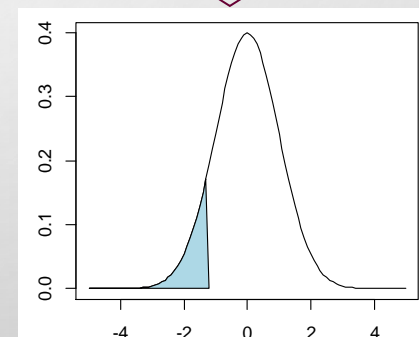


$$Z_{\text{exp}} \leq -Z_{\alpha/2}$$

$$Z_{\text{exp}} \geq Z_{\alpha/2}$$



$$Z_{\text{exp}} \geq Z_{\alpha}$$



$$Z_{\text{exp}} \leq -Z_{\alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para una población Normal:

Contrastes sobre la **media**

**Varianza Desconocida**

Estadístico de  
contraste

$$T = \frac{\bar{X} - \mu_0}{S / \sqrt{n}} \rightarrow t_{n-1}$$

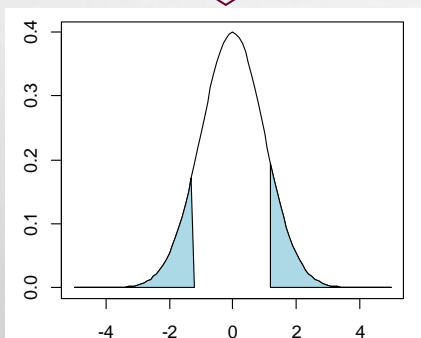
Hipótesis del  
test

$$H_0 : \mu = \mu_0$$
$$H_1 : \mu \neq \mu_0$$

$$H_0 : \mu \leq \mu_0$$
$$H_1 : \mu > \mu_0$$

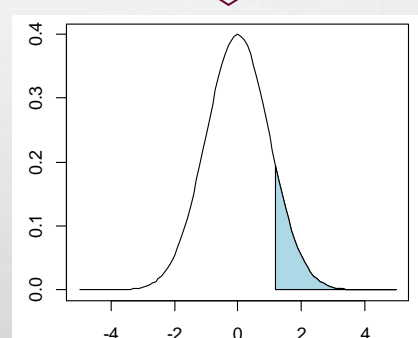
$$H_0 : \mu \geq \mu_0$$
$$H_1 : \mu < \mu_0$$

Criterio de  
rechazo

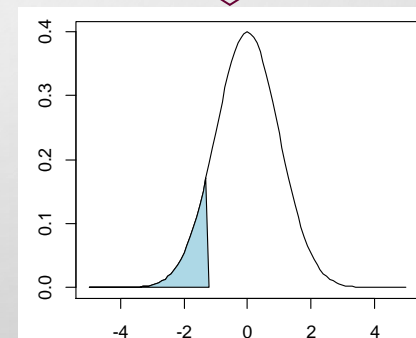


$$t_{\text{exp}} \leq -t_{n-1, \alpha/2}$$

$$t_{\text{exp}} \geq t_{n-1, \alpha/2}$$



$$t_{\text{exp}} \geq t_{n-1, \alpha}$$



$$t_{\text{exp}} \leq -t_{n-1, \alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para una población Normal:

Contrastes sobre la **media**

**Varianza Desconocida,  $n > 30$**

Estadístico de  
contraste

$$Z = \frac{\bar{X} - \mu_0}{S / \sqrt{n}} \rightarrow N(0, 1)$$

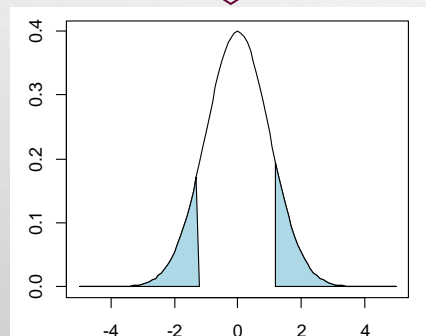
Hipótesis del  
test

$$H_0 : \mu = \mu_0$$
$$H_1 : \mu \neq \mu_0$$

$$H_0 : \mu \leq \mu_0$$
$$H_1 : \mu > \mu_0$$

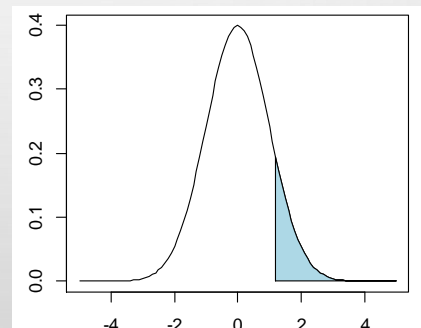
$$H_0 : \mu \geq \mu_0$$
$$H_1 : \mu < \mu_0$$

Criterio de  
rechazo

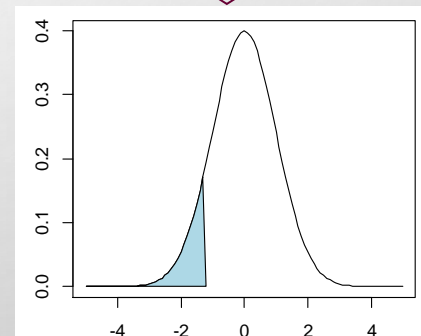


$$Z_{\text{exp}} \leq -Z_{\alpha/2}$$

$$Z_{\text{exp}} \geq Z_{\alpha/2}$$



$$Z_{\text{exp}} \geq Z_{\alpha}$$



$$Z_{\text{exp}} \leq -Z_{\alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para una población Normal:

Contrastes sobre la **varianza**

Estadístico de  
contraste

$$\chi^2 = \frac{(n-1)S^2}{\sigma_0^2} \rightarrow \chi_{n-1}^2$$

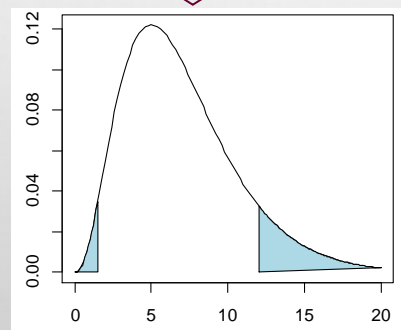
Hipótesis del  
test

$$H_0 : \sigma^2 = \sigma_0^2$$
$$H_1 : \sigma^2 \neq \sigma_0^2$$

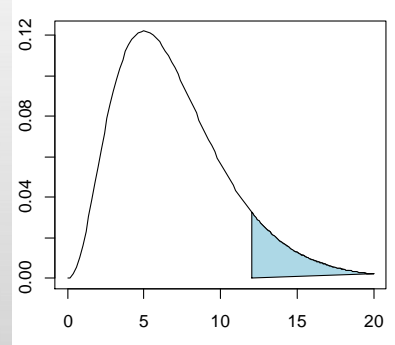
$$H_0 : \sigma^2 \leq \sigma_0^2$$
$$H_1 : \sigma^2 > \sigma_0^2$$

$$H_0 : \sigma^2 \geq \sigma_0^2$$
$$H_1 : \sigma^2 < \sigma_0^2$$

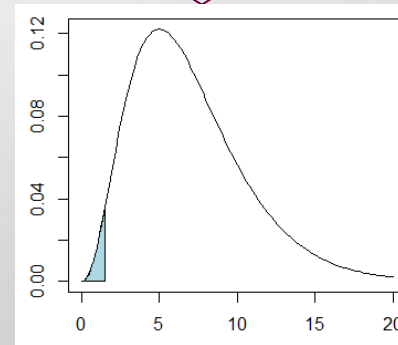
Criterio de  
rechazo



$$\chi_{\text{exp}}^2 \leq \chi_{n-1, 1-\alpha/2}^2$$
$$\chi_{\text{exp}}^2 > \chi_{n-1, \alpha/2}^2$$



$$\chi_{\text{exp}}^2 \geq \chi_{n-1, \alpha}^2$$



$$\chi_{\text{exp}}^2 \leq \chi_{n-1, 1-\alpha}^2$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para una población Binomial:

Contrastes sobre una proporción

Estadístico de  
contraste

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \rightarrow N(0,1)$$

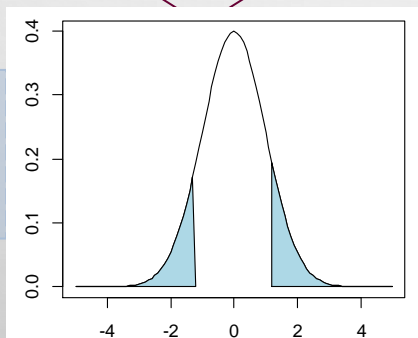
Hipótesis del  
test

$$H_0 : p = p_0$$
$$H_1 : p \neq p_0$$

$$H_0 : p \leq p_0$$
$$H_1 : p > p_0$$

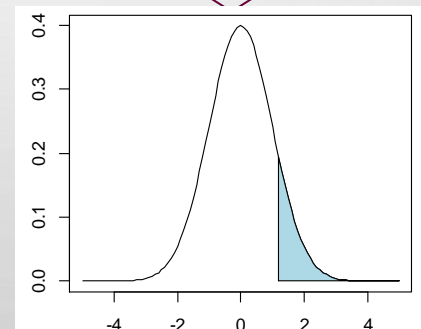
$$H_0 : p \geq p_0$$
$$H_1 : p < p_0$$

Criterio de  
rechazo

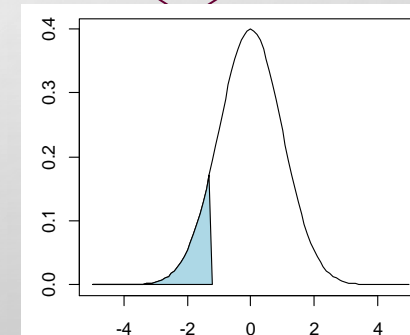


$$Z_{\text{exp}} \leq -Z_{\alpha/2}$$

$$Z_{\text{exp}} \geq Z_{\alpha/2}$$



$$Z_{\text{exp}} \geq Z_{\alpha}$$



$$Z_{\text{exp}} \leq -Z_{\alpha}$$



The background of the slide is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and scattered. They are primarily located in the top-left and bottom-right corners, with a few smaller ones in the center and along the edges.

# DOS MUESTRAS INDEPENDIENTES



# Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:

Contrastes sobre la diferencia de medias

Varianzas Conocidas

Estadístico de  
contraste

$$Z = \frac{(\bar{X} - \bar{Y}) - \mu_0}{\sqrt{\frac{\sigma_x^2}{n_x} + \frac{\sigma_y^2}{n_y}}} \rightarrow N(0,1)$$

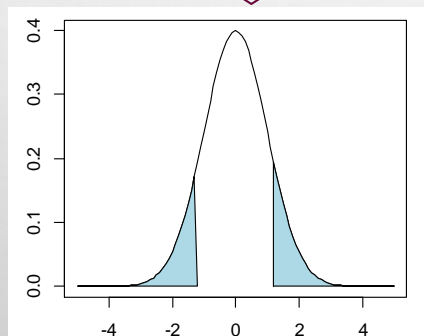
Hipótesis del  
test

$$H_0 : \mu_x - \mu_y = \mu_0$$
$$H_1 : \mu_x - \mu_y \neq \mu_0$$

$$H_0 : \mu_x - \mu_y \leq \mu_0$$
$$H_1 : \mu_x - \mu_y > \mu_0$$

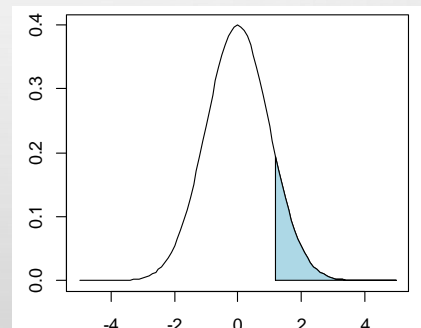
$$H_0 : \mu_x - \mu_y \geq \mu_0$$
$$H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de  
rechazo

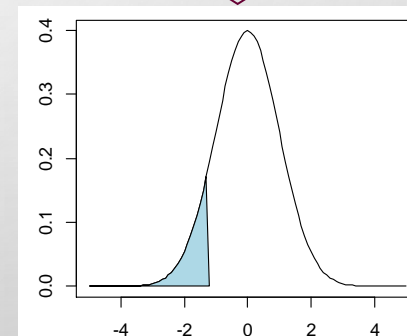


$$Z_{\text{exp}} \leq -Z_{\alpha/2}$$

$$Z_{\text{exp}} \geq Z_{\alpha/2}$$



$$Z_{\text{exp}} \geq Z_{\alpha}$$



$$Z_{\text{exp}} \leq -Z_{\alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:

Contrastes sobre la diferencia de medias

**Varianzas desconocidas pero iguales**

$$S_p = \sqrt{\frac{(n_x - 1)S_x^2 + (n_y - 1)S_y^2}{n_x + n_y - 2}}$$

Estadístico de  
contraste

$$T = \frac{\bar{X} - \bar{Y} - \mu_0}{S_p \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}} \rightarrow t_{n_x + n_y - 2}$$

Hipótesis del  
test

$$H_0 : \mu_x - \mu_y = \mu_0$$

$$H_1 : \mu_x - \mu_y \neq \mu_0$$

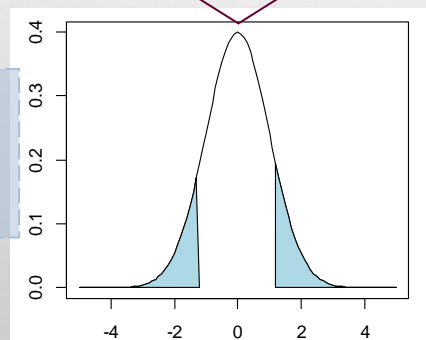
$$H_0 : \mu_x - \mu_y \leq \mu_0$$

$$H_1 : \mu_x - \mu_y > \mu_0$$

$$H_0 : \mu_x - \mu_y \geq \mu_0$$

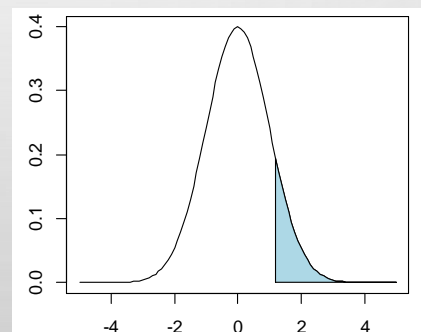
$$H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de  
rechazo

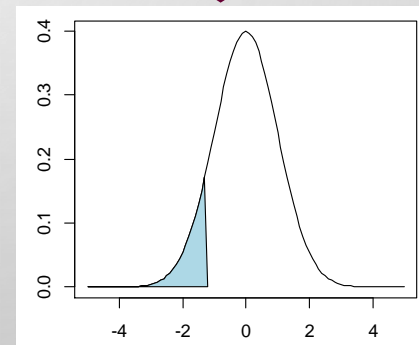


$$t_{\text{exp}} \leq -t_{n_x + n_y - 2, \alpha/2}$$

$$t_{\text{exp}} \geq t_{n_x + n_y - 2, \alpha/2}$$



$$t_{\text{exp}} \geq t_{n_x + n_y - 2, \alpha}$$



$$t_{\text{exp}} \leq -t_{n_x + n_y - 2, \alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:

Contrastes sobre la diferencia de medias

Varianzas desconocidas, distintas o no,  
tamaños muestrales grandes

$(n_x, n_y \geq 30)$

Estadístico de  
contraste

$$Z = \frac{(\bar{X} - \bar{Y}) - \mu_0}{\sqrt{\frac{S_x^2}{n_x} + \frac{S_y^2}{n_y}}} \rightarrow N(0,1)$$

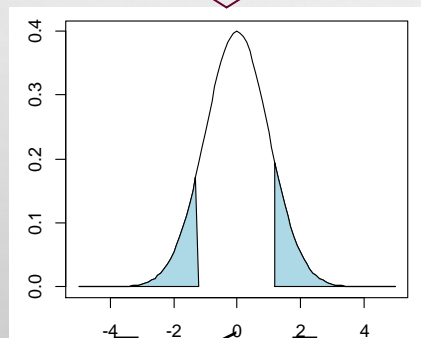
Hipótesis del  
test

$$H_0 : \mu_x - \mu_y = \mu_0$$
$$H_1 : \mu_x - \mu_y \neq \mu_0$$

$$H_0 : \mu_x - \mu_y \leq \mu_0$$
$$H_1 : \mu_x - \mu_y > \mu_0$$

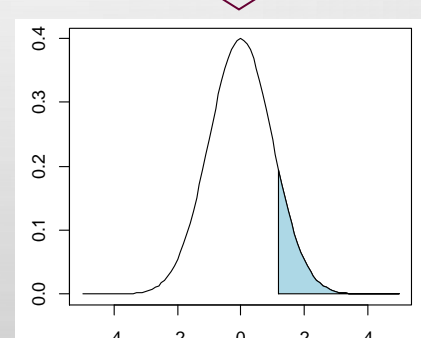
$$H_0 : \mu_x - \mu_y \geq \mu_0$$
$$H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de  
rechazo

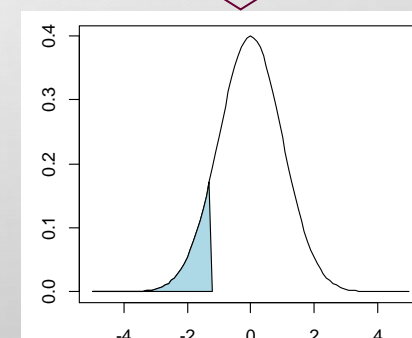


$$z_{\text{exp}} \leq -z_{\alpha/2}$$

$$z_{\text{exp}} \geq z_{\alpha/2}$$



$$z_{\text{exp}} \geq z_{\alpha}$$



$$z_{\text{exp}} \leq -z_{\alpha}$$

# Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:

Contrastes sobre el **cociente de varianzas**

Hipótesis del  
test

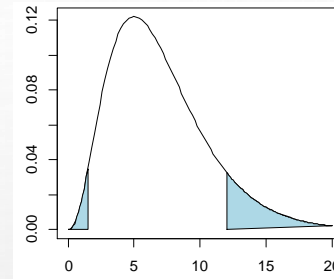
Criterio de  
rechazo

Estadístico de  
contraste

$$F = \frac{S_x^2}{S_y^2} \rightarrow F_{n_x-1, n_y-1}$$

$$H_0: \sigma_x^2 = \sigma_y^2$$

$$H_1: \sigma_x^2 \neq \sigma_y^2$$

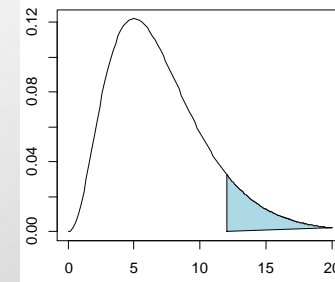


$$F_{\text{exp}} \leq F_{n_x-1, n_y-1, 1-\alpha/2}$$

$$F_{\text{exp}} \geq F_{n_x-1, n_y-1, \alpha/2}$$

$$H_0: \sigma_x^2 \leq \sigma_y^2$$

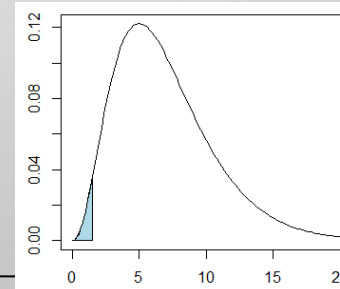
$$H_1: \sigma_x^2 > \sigma_y^2$$



$$F_{\text{exp}} \geq F_{n_x-1, n_y-1, \alpha}$$

$$H_0: \sigma_x^2 \geq \sigma_y^2$$

$$H_1: \sigma_x^2 < \sigma_y^2$$



$$F_{\text{exp}} \leq F_{n_x-1, n_y-1, 1-\alpha}$$

# Inferencia Estadística: Tests de hipótesis

## Contrastes para dos poblaciones Binomiales:

### Contrastes sobre la diferencia de proporciones

Estadístico de  
contraste

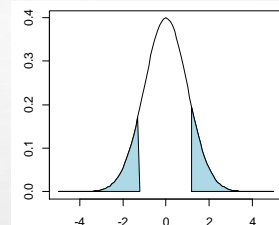
$$Z = \frac{(\hat{p}_x - \hat{p}_y) - p_0}{\sqrt{\frac{\hat{p}_x(1-\hat{p}_x)}{n_x} + \frac{\hat{p}_y(1-\hat{p}_y)}{n_y}}} \rightarrow N(0,1)$$

Criterio de  
rechazo

Hipótesis del  
test

$$H_0 : p_x - p_y = p_0$$

$$H_1 : p_x - p_y \neq p_0$$

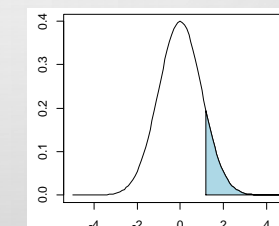


$$Z_{\text{exp}} \leq -Z_{\alpha/2}$$

$$Z_{\text{exp}} \geq Z_{\alpha/2}$$

$$H_0 : p_x - p_y \leq p_0$$

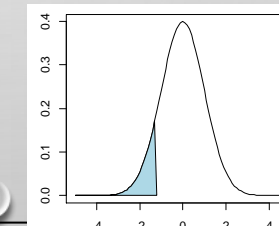
$$H_1 : p_x - p_y > p_0$$



$$Z_{\text{exp}} \geq Z_{\alpha}$$

$$H_0 : p_x - p_y \geq p_0$$

$$H_1 : p_x - p_y < p_0$$



$$Z_{\text{exp}} \leq -Z_{\alpha}$$