

# Hypothesis testing for normal.

Notation: Confidence level  $c$  ; Significant level  $\alpha = 1 - c$  ;

Sample size is  $n$

Some comments:

- If we can reject  $H_0$  on level  $\alpha$ , then we can reject it on any higher level. (The reverse is not true.)

- Theorem: (For two-sided test)

A  $c$ -level CI includes  $\mu_0 \Leftrightarrow$  Retain  $H_0 : \mu = \mu_0$  with

$$\alpha = 1 - c \Leftrightarrow p - value > \alpha$$

A  $c$ -level CI doesn't include  $\mu_0 \Leftrightarrow$  Reject  $H_0 : \mu = \mu_0$  with

$$\alpha = 1 - c \Leftrightarrow p - value < \alpha$$

- If we have a hypothesis testing with level  $\alpha$ , then  $P(\text{Type I error}) = \alpha$ .
- The standard error for normal case is  $se = \frac{\hat{\sigma}^2}{n}$ , where  $\hat{\sigma}^2$  is the sample variance.