

Ch. 11 : Hypotheses Tests

Section 11.1

Hypothesis : claim about a
popul. parameter or
characteristic

e.g. μ , p , etc.

MPC

$$H_0 : \mu = 30$$

2 sided alternative

$$H_a : \mu \neq 30$$

2-tailed test

null hyp.

alternative hyp.

Sufficiently

High or low value
of $\bar{x}$

= 29	40
28	20

→ reject H_0

→ fail to reject H_0

→ never accept!

BMI

$$H_0 : \mu = 29$$

1-sided alt.

$$H_a : \mu < 29$$

1-tailed test

Can high values of $\bar{x}$

→ rej. of H_0 ? No.

e.g. 32, 31, 40

Low values of $\bar{x}$ → rej. H_0

e.g. 25, 22, ...

ATI

$$H_0 : \mu = 50$$

1-sided alt.

$$H_a : \mu > 50$$

1-tailed test

Can high values of $\bar{x}$

→ rej. of H_0 ?

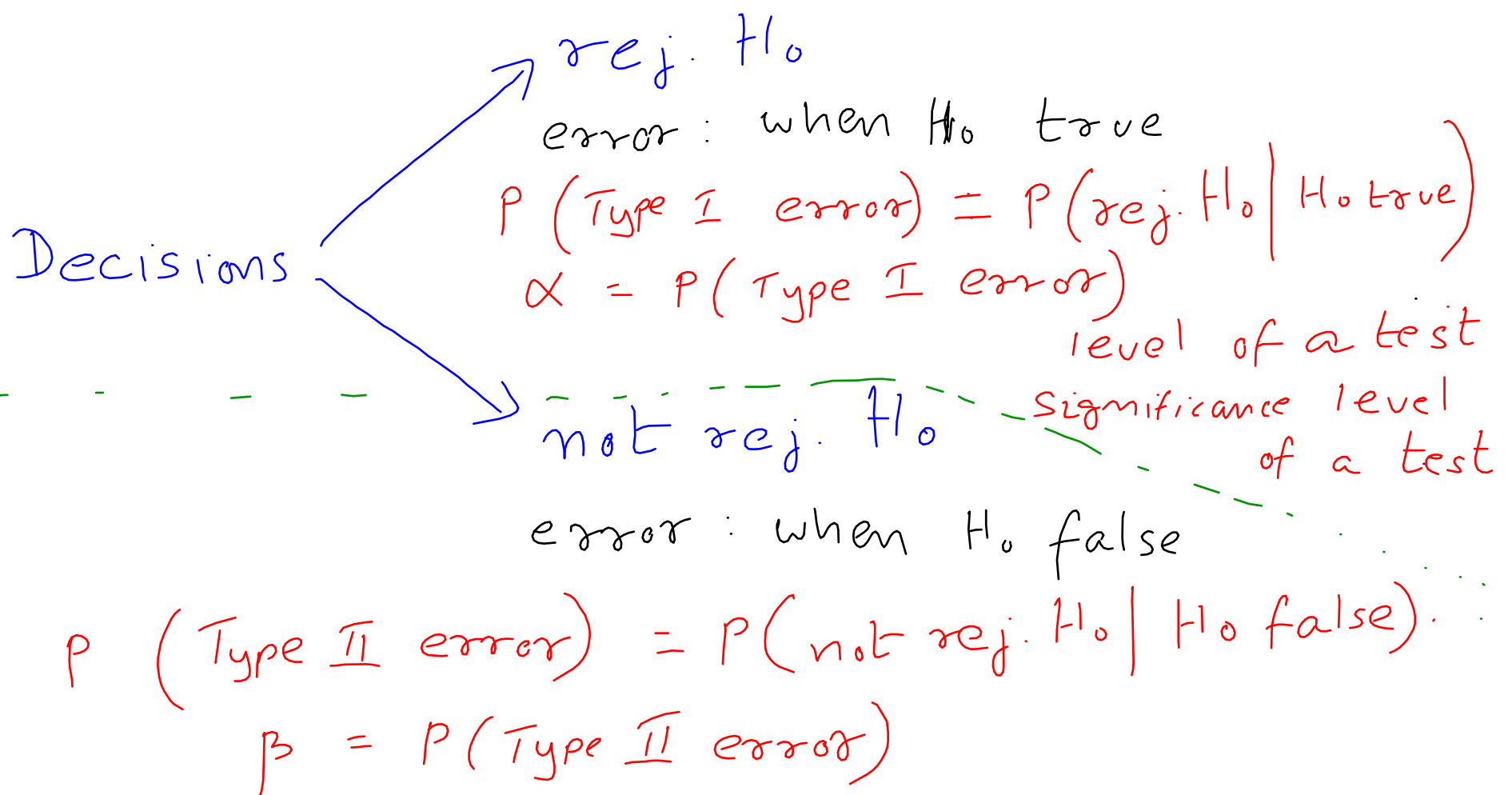
e.g. 60, 77, 80, 100 Yes, potentially!

Low values? e.g. 27, 30, 32, ...

Not lead to

rej. of H_0 .

↓
Sufficiently high



Trade off b/w α & β .

Using $\alpha = 0.1, 0.05, 0.01$

Section 11.2 (σ known)

$$H_0: \mu = 30$$

$$\sigma = 5$$

$$H_a: \mu \neq 30$$

$$n = 25$$

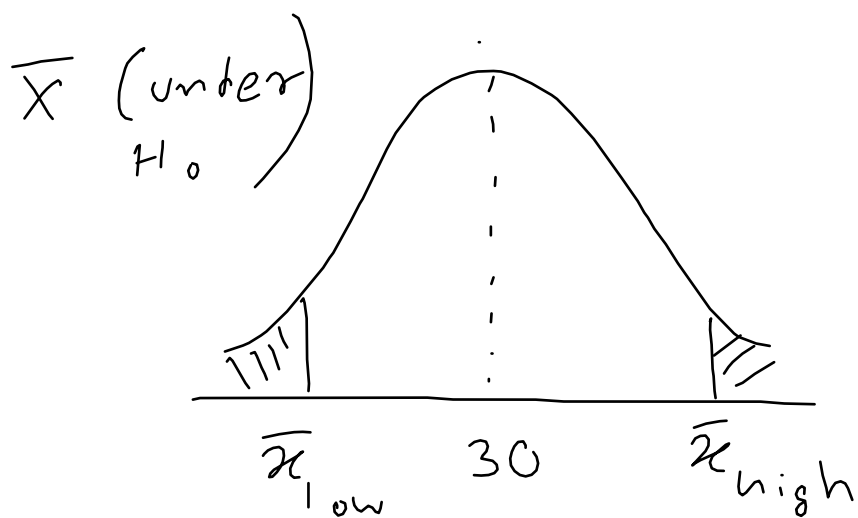
$$\begin{array}{l} \bar{X} \begin{cases} \nearrow \text{avg.} = 30 \\ \searrow \text{std. dev.} = \frac{\sigma}{\sqrt{n}} = 1 \end{cases} \end{array}$$

distribution? Normal

$$\bar{X} \sim N(30, 1) \begin{array}{l} \nearrow \text{assuming } H_0 \\ \searrow \text{under } H_0 \end{array}$$

Have I assumed H_0 to be true?

Yes, we used $\mu = 30$.



$$\boxed{\text{shaded area}} = \alpha = P(\text{rej. } H_0 \mid H_0 \text{ true})$$

$\downarrow$ 0.01
e.g. 0.05
0.1