

# Inference in SLR

(STATS310.3: Simple linear regression)

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# Elements of inference in simple linear regression

Basic inference: Test hypotheses and generate confidence intervals for slope and intercept.

## Testing hypotheses concerning the slope

Want to investigate formally whether  $\beta = 0$  under Gaussian assumption and independence.

Recall

$$\frac{\hat{\beta} - \beta}{\hat{\sigma}_{\hat{\beta}}} \sim t_{n-2}$$

$H_0 : \beta = \beta_0$  vs  $H_a : \beta \neq \beta_0$

$$t := \frac{\hat{\beta} - \beta_0}{\hat{\sigma}_{\hat{\beta}}} \sim t_{n-2}$$

Reject  $H_0$  if  $|t| > t_{n-2, 1-\alpha/2}$ .

# Confidence interval for the slope

Use same t-distribution  
Invert for confidence interval

# Inference for the intercept

Same procedure as for the slope gives a confidence statement for the intercept.

# Overview and vocabulary

Vocabulary:

\* Inference \* Confidence intervals \* Hypothesis tests