III. Simple Regression.

A. Introduction
B. Population Regression Equation
C. Sample Regression Equation
D. Ordinary Least Squares
E. Classical Regression Model.
F. Properties of OLS Estimators (**BLUE**)
G. Estimator for σ^2
H. Inference (we've done this before!)

H. Inference in Simple Regression

1. **Introduction:**
   Inference: Combine point estimates and ***sampling distribution information.***
2. **σ^2 known**
3. **σ^2 NOT known**

4. Hypothesis tests: Six Steps

Step 1: Hypotheses. Start with the ***alternative*** or ***research hypothesis***.

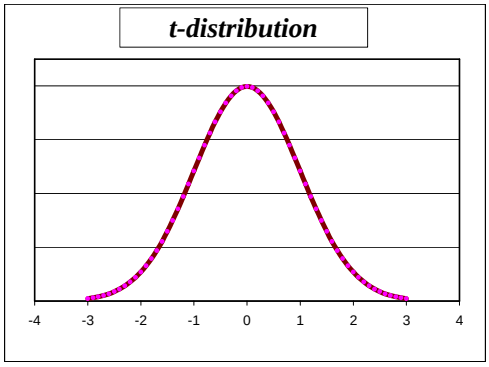
Tests for β_1 – what does theory suggest for the effect of X on Y? This determines your alternative hypothesis.

Using your sample of 30 used 2004 Honda Accords, test the hypothesis we just stated.

Step 1: State the hypotheses:

Step 2: Choose the level of significance.

Step 3: Determine ***critical value(s).*** Draw!



Step 4: Draw your sample, estimate, determine the value for the standardized test statistic:

$$t_{calc} = \frac{\hat{\beta}_1 - \beta_1^0}{s_{\hat{\beta}_1}}$$

PRS 4: Using **your** regression results, **calculate the test statistic** for the hypothesis stated above. **Round to 3 decimal places.**

Step 5: Compare – how do you make a decision?

PRS 5: Complete the hypothesis test:

$H_o: \beta_1 \geq 0$; $H_a: \beta_1 < 0$,

using **your sample** of 30 used 2004 Honda Accords. What is your conclusion?

0. **Reject H_o.**
1. **Fail to Reject H_o**

Step 6: Conclusion.

Fail to Reject:

Reject:

The true PRF for used 2004 Accords is:

E[Price | Miles] = $23,383.90 – $0.0894 Miles

What is the appropriate test for a **true null hypothesis for the effect of mileage on price?**

Set up this test:

(1) Hypothesis
(2) Choose level of significance.
(3) Determine critical values.