

# Proof by Contradiction

## Null Hypothesis Test

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□ **Proposition :**

$$\tau_2 \neq \tau_1$$

□ **Proof :**

**Proof is by contraction. Assume  $\tau_2 \neq \tau_1$  is not true, that is,  $\tau_2 = \tau_1 = 0$ .**

**Then ... ?**

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## Null Hypothesis Test

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### ☐ Calculate a test statistic

- ☐

```
> wilcox.test(Yield ~ Product, paired=TRUE,...)
Wilcoxon signed rank test
data: Yield by Product
V = 0, p-value = 0.125
```
- ☐

```
> t.test(Yield ~ Product, paired=TRUE, ...)
Paired t-test
data: Yield by Product
t = -2.1319, df = 3, p-value = 0.1228
```
- ☐

```
> friedman.test(Yield ~ Block | Product, ...)
Friedman rank sum test
data: Yield and Block and Product
Friedman chi-squared = 6, df = 3, p-value = 0.1116
```
- ☐

```
> anova(Yield ~ Block + Product, ...)
Analysis of Variance Table
Response: Yield
Df Sum Sq Mean Sq F value Pr(>F)
Block      3 363.52 121.173  43.230 0.005732 **
Product     1  12.74   12.739   4.545 0.122791
Residuals   3   8.41    2.803
```

### ☐ Is that statistic 'absurd' given that the null hypothesis is taken axiomatically true?

☐  $p(\text{false}) = 0 < p(t) < p(\text{true}) = 1$