M339G : February 2nd, 2024.

Multiple Linear Regression.

explanatory r.v.s. $(X_1, X_2, \dots, X_p) = X$

response r.v. Y

Regression model: $Y = f(X) + \varepsilon$

w/ X and ε are independent

Multiple linear regression:

$$Y = \underbrace{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p}_{f(x)} + \varepsilon$$

With interaction terms:

e.g., $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_{12} X_1 X_2 + \varepsilon$

F-distribution.

Def'n. Let U and V be chi-squared random variables w/ ν_1 and ν_2 degrees of freedom, respectively. Then, w/ U and V independent, the random variable

$$F = \frac{U/\nu_1}{V/\nu_2}$$

is said to have the F-distribution w/ numerator degrees of freedom ν_1 and denominator degrees of freedom ν_2.

We write $\boxed{F \sim F(\nu_1, \nu_2)}$.