Resumen

ANOVA

Muestra 1: $X_{11}, X_{12}, ..., X_{1n_1}$ vs. as. i.i.d N(μ_1, σ^2)
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Muestra i: $X_{i1}, X_{i2}, ..., X_{in_i}$ vs. as. i.i.d N(μ_i, σ^2)
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Muestra k: $X_{i1}, X_{k2}, ..., X_{kn_k}$ vs. as. i.i.d N(μ_k, σ^2)

$$s_p^2 = \frac{\sum_{i=1}^{k}(n_i - 1) * s_i^2}{n-k} \qquad \text{donde} \qquad n = n_1 + \ldots + n_k$$

$$F = \frac{\left(\sum_{i=1}^{k} n_i (\overline{X}_i - \overline{X})^2\right) / (k-1)}{s_p^2} \qquad \overline{X} = \frac{\sum_{i=1}^{k} n_i \overline{X}_i}{n} = \frac{\sum_{i=1}^{k}\sum_{j=1}^{n_i} X_{ij}}{n}$$

$$Var(\overline{X}_i - \overline{X}_j) = \sigma^2\left(\frac{1}{n_i} + \frac{1}{n_j}\right)$$

Regresión Lineal

Sean (x_i, Y_i) i = 1,...,n pares ordenados.

Estimadores de los parámetros de un modelo de regresión lineal:

$$\hat{\beta} = \frac{(\sum_{i=1}^{n} x_i Y_i) - n\,\bar{x}\,\bar{Y}}{(\sum_{i=1}^{n} x_i^2) - n\,\bar{x}^2} \qquad \hat{\alpha} = \bar{Y} - \hat{\beta}\,\bar{x}$$

$$E(\hat{\alpha}) = \alpha \qquad Var(\hat{\alpha}) = \sigma^2 \left[\frac{1}{n} + \frac{\bar{x}^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \right]$$

$$E(\hat{\beta}) = \beta \qquad Var(\hat{\beta}) = \frac{\sigma^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

$$Var(\hat{\alpha} + \hat{\beta}\,x_0) = \sigma^2 \left[\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \right]$$

$$Var(Y_{n+1} - \hat{Y}_{n+1}) = \sigma^2 \left[1 + \frac{1}{n} + \frac{(x_{n+1} - \bar{x})^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \right]$$

$$\hat{x} = \frac{Y - \hat{\alpha}}{\hat{\beta}}$$

$$\hat{V}ar(\hat{x}) = \frac{s^2}{\hat{\beta}^2} \left[1 + \frac{1}{n} + \frac{(Y - \bar{Y})^2}{\hat{\beta}^2 \sum_{i=1}^{n}(x_i - \bar{x})^2} \right]$$

donde $s^2 = \frac{\sum_{i=1}^{n}(Y_i - (\hat{\alpha} + \hat{\beta}\,x_i))^2}{n-2}$ es un estimador de σ^2.