0.0.1 One-way Model

Let y_{ik} denote the score from the ith subject in response to the kth item ($1 \leq i \leq n$, $1 \leq k \leq K$). Consider modeling y_{ik} using a single-factor, linear random-effect model:

$$y_{ik} = \mu + \beta_i + \epsilon_{ik}, \quad \beta_i \sim N\left(0, \sigma_\beta^2\right), \quad \epsilon_{ik} \sim N\left(0, \sigma^2\right), \quad \beta_i \perp \epsilon_{ik}$$
$$1 \leq k \leq K, \quad 1 \leq i \leq n.$$

The ICC in this model is $\rho = \frac{\sigma_\beta^2}{\sigma_\beta^2 + \sigma^2}$ based on the linear mixed effect model. In this R function we used a distribution-free alternative to provide robust inference of ICC based on the theory of U-statistics.