Three - way ANOVA table with general formula

- Three factors A, B, and C having a, b and c, levels, respectively

Data for three - way ANOVA

Y, the response variable

Factor A with levels $i = 1$ to a

Factor B with levels $j = 1$ to b

Factor C with levels $k = 1$ to c

Y_{ijkl} is the l^{th} observation in cell (i, j, k), $l = 1$ to n_{ijk}

A balanced design has $n_{ijk} = n$

Cell Means Model

$$Y_{ijk} = \mu_{ijk} + \varepsilon_{ijkl}$$

where,

- μ_{ijk} is the theoretical mean or expected value of all observations in cell (i, j, k).
- $\varepsilon_{ijkl} \overset{iid}{\sim} N(0, \sigma^2)$
- $Y_{ijkl} \sim N(\mu_{ijk}, \sigma^2)$ are independent