Linear Mixed Effects Model as a generalisation of a fixed effect model:

Fixed effects:

$$y_{ij} = \mu + herd_j + e_{ij}$$

- $herd_j$: fixed effect of herd j on weaning weight
- e_{ij}: random residual
- y_{ij}: weaning weight of animal i in herd j

Mixed effects:

$$y_{ijk} = \mu + herd_j + u_i + e_{ijk}$$

- u_i: breeding value of animal i as random effect.

Insert information from data into model:

$$\begin{aligned}
y_{12,1,1} &= \mu + herd_1 + u_{12} + e_{12,1,1} \\
y_{13,1,1} &= \mu + herd_1 + u_{13} + e_{13,1,1} \\
&\vdots \\
y_{27,2,1} &= \mu + herd_2 + u_{27} + e_{27,2,1}
\end{aligned}$$

- 2.61
- 2.31
- 3.16
- $y_{27,2,1}$: y
- μ: unknown
- $herd_1$, $herd_2$: unknown
- u_{12}, u_{13}: known
- u_{27}: unknown
- $e_{12,1,1}$, $e_{13,1,1}$, $e_{27,2,1}$: unknown