Recap:

- Problem of correcting systematic environment with
  - regression
  - selection index

→ Solution: Use BLUP together with a mixed linear effect model to estimate systematic environment (herd, sex, season,) effects and to predict breeding values as random effects simultaneously from the same data set.

→ Model: $y = X\beta + Zu + e$ (1. part) → (2. part)

$E(u) =$ $\quad var(u) = \ldots$

$E(e) =$ $\quad var(e) = \ldots$

$E(y) =$ $\quad var(y) = \ldots$

with β, u and e being unkown

Fit data, obtain $\hat{\beta}$ as estimaks for fixed effects and $\hat{u}$ as predictions of breeding values

- Problem with $\hat{u}$ and $\hat{\beta}$: depend on V^{-1} where $V = var(y)$ { Practical evaluations, y can have the length of 10^{7} }
- Solution: Mixed model equations