$$y = Xb + Zu + e$$

Traditional Animal Model

u: random breeding values

$$Var(u) = A\,\sigma_u^2$$

A: genetisch-additive
Verwandtschaftsmatrix

SSGBLUP

$$u = \begin{bmatrix} u_1 \\ u_2 \end{bmatrix}$$

u_1: non-genotyped animals
u_2: genotyped animals

$$Var(u_2) = G$$

$$Var(u_1) = A_{11} + A_{12}A_{22}^{-1}(G - A_{22})A_{22}^{-1}A_{21}$$

$$Cov(u_1, u_2) = A_{12}A_{22}^{-1}G$$

G: genomic relationship matrix

Assume: $\sigma_u^2 = 1$