- BLUP of u

  $\text{var}(u - \hat{u})$ is called Prediction Error Variance (PEV)

- u is random $\Rightarrow$ $\text{var}(u) = G$

- Compute $\text{var}(u - \hat{u}) = \text{var}(u) + \text{var}(\hat{u}) - 2\,\text{Cov}(u, \hat{u})$

- Based on properties of BLUP

  $\text{var}(\hat{u}) = \text{cov}(u, \hat{u})$ insert in PEV

  where $\hat{u} = G \cdot Z \cdot V^{-1}(y - X\beta)$

$\Rightarrow$ $\text{PEV} = \text{var}(u - \hat{u}) = \text{var}(u) + \text{var}(\hat{u}) - 2\,\text{cov}(u, \hat{u})$

$= \text{var}(u) - \text{var}(\hat{u})$

- PEV is related to reliability (B% - Bestimmtheitsmaß)

  $B = r_{u,\hat{u}}^2$ with $B\% = 100 \cdot B$