

(2)

Variance:

$$\begin{aligned}\text{var}(V_{ij}) &= \dots = 2pq\alpha^2 + (2pq\sigma)^2 \\ &= \sigma_A^2 + \sigma_D^2\end{aligned}$$

Using the decomposition:

$$\begin{aligned}\text{var}(V_{ij}) &= \text{var}(\mu + BV_{ij} + D_{ij}) \\ &= \text{var}(BV_{ij}) + \text{var}(D_{ij}) \\ &= \sigma_A^2 + \sigma_D^2\end{aligned}$$

with  $\text{var}(BV_{ij}) = \sigma_A^2 = 2pq\alpha^2$

$$\text{var}(D_{ij}) = \sigma_D^2 = (2pq\sigma)^2$$

genetic  
additive  
variance