□ For MME, G^{-1} is required which can be partitioned accordingly. Assuming

$$var\begin{bmatrix} g_1 \\ g_2 \end{bmatrix} = \begin{bmatrix} G_{11} & G_{12} \\ G_{21} & G_{22} \end{bmatrix} \cdot \sigma_g^2$$

$$\Rightarrow G = \begin{bmatrix} G_{11} & G_{12} \\ G_{21} & G_{22} \end{bmatrix} \Rightarrow G^{-1} = \begin{bmatrix} G^{(11)} & G^{(12)} \\ G^{(21)} & G^{(22)} \end{bmatrix}$$

three times per year

$$\Rightarrow \text{MME}: \begin{bmatrix} X^TX & X^TZ & 0 \\ Z^TX & Z^TZ + G^{(11)}\lambda & G^{(12)}\lambda \\ 0 & \lambda \cdot G^{(21)} & \lambda \cdot G^{(22)} \end{bmatrix} \begin{bmatrix} \hat{\beta} \\ \hat{g}_1 \\ \hat{g}_2 \end{bmatrix} = \begin{bmatrix} X^Ty \\ Z^Ty \\ 0 \end{bmatrix}$$

genomic breeding values for young animals

every second week

$$0 \cdot \hat{\beta} + \lambda \cdot G^{(21)} \cdot \hat{g}_1 + \lambda \cdot G^{(22)} \cdot \hat{g}_2 = 0$$

$$G^{(21)} \cdot \hat{g}_1 + G^{(22)} \cdot \hat{g}_2 = 0$$

$$G^{(22)} \cdot \hat{g}_2 = -G^{(21)} \hat{g}_1$$

$$\hat{g}_2 = -\left[G^{(22)}\right]^{-1} \cdot G^{(21)} \cdot \hat{g}_1$$