- Genomic Breeding values g are a linear combination of marker effects q, i.e.,

$$g = U \cdot q$$

- Determine U:
  - $E(g) = 0$

- Equivalence between MEM and BUM

$$y_i = \mu + w_i^T \cdot q + e_i \quad \text{(MEM)}$$

$$y_i = \mu + g_i + e_i \quad \text{(BUM)}$$

- Because $g_i = w_i^T \cdot q$

with $E[g_i] = 0 \Rightarrow E[w_i^T \cdot q] = q\, E[w_i^T]$

(q: Marker effect)

with random variable w_i encoding the genotyp

$$w = \begin{cases} 1 & \text{with probability } p^2 \ (\Leftrightarrow G_1G_1) \\ 0 & 2pq \ (G_1G_2) \\ -1 & q^2 \ (G_2G_2) \end{cases}$$

$E[w_i] = 2p - 1 \neq 0$