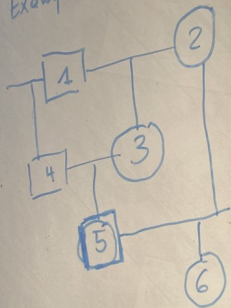


Relationship between animals based on pedigree:

Example



$$u = \begin{bmatrix} u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \\ u_6 \end{bmatrix}$$

$$\text{var}(u) = \begin{bmatrix} \text{var}(u_1) & \text{cov}(u_1, u_2) & \dots \\ \vdots & \vdots & \vdots \end{bmatrix}$$

Related means: animals have common ancestors

- Based on pedigree: animals 1 and 2 are not related

$$\Rightarrow \text{cov}(u_1, u_2) = 0$$

- $\text{cov}(u_1, u_3)$: animal 3 is an offspring of parent 1

\Rightarrow decompose u_3 into: ~~$u_3 = \frac{1}{2}u_1 + \frac{1}{2}u_2 + u_3$~~

$$u_3 = \frac{1}{2}u_1 + \frac{1}{2}u_2 + u_3$$