

## Step 2: Full decomposition

□ So far:

$$u_i = \frac{1}{2} u_s + \frac{1}{2} u_d + m_i$$

□ Continue:

$$u_s = \frac{1}{2} u_{ss} + \frac{1}{2} u_{ds} + m_s$$

$$u_d = \frac{1}{2} u_{sd} + \frac{1}{2} u_{dd} + m_d$$

...

} recursively  
applying simple  
decomposition  
through the  
complete pedigree

□ Example:

$$u_1 = m_1$$

$$u_2 = m_2$$

$$u_3 = m_3$$

$$u_4 = \frac{1}{2} u_1 + \frac{1}{2} u_2 + m_4$$

$$= \frac{1}{2} [m_1] + \frac{1}{2} [m_2] + m_4$$

$$u_5 = \frac{1}{2} u_3 + \frac{1}{2} [u_4] + m_5$$

$$= \frac{1}{2} m_3 + \frac{1}{2} m_2 + m_5$$

$$u_6 = \frac{1}{2} u_4 + \frac{1}{2} u_5 + m_6$$

$$= \frac{1}{2} \left[ \frac{1}{2} m_1 + \frac{1}{2} m_2 + m_4 \right] +$$

$$\frac{1}{2} \left[ \frac{1}{2} m_3 + \frac{1}{2} m_2 + m_5 \right] + m_6$$

} No changes for animals  
parents without  
parents