

Recap:

A Goal: Understand of summary (lm())
↓
with factors and levels, such Breed

□ Assign separate effects to each level (different breeds)

⇒ Matrix X in model $y = Xb + \epsilon$
has not full column rank

⇒ No single solution to the least squares normal equation

$$X^T X b^0 = X^T y$$

□ A solution is given by $b^0 = (X^T X)^{-1} X^T y$
 $= G X^T y$

with $G = (X^T X)^{-1}$