Universidad de Castilla-La Mancha

CAMPUS DE EXCELENCIA INTERNACIONAL

Escuela Técnica Superior de Ingenieros Agrónomos y de Montes

Valoración genética

ASIGNATURA: MEJORA GENÉTICA VEGETAL Y ANIMAL

GRADO EN BIOTECNOLOGÍA

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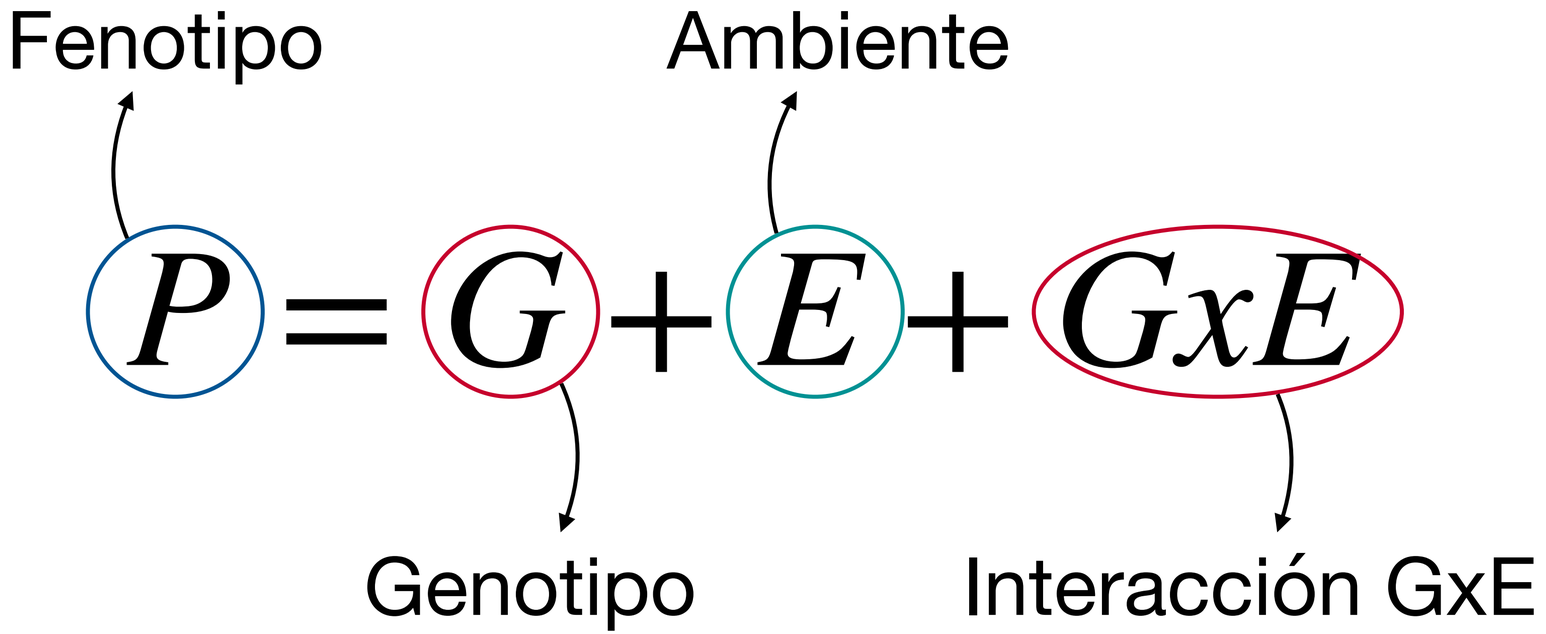
Fenotipo, genotipo y ambiente



Modelo animal

$$\mathbf{y} = \mathbf{Xb} + \mathbf{Zu} + \mathbf{e}$$

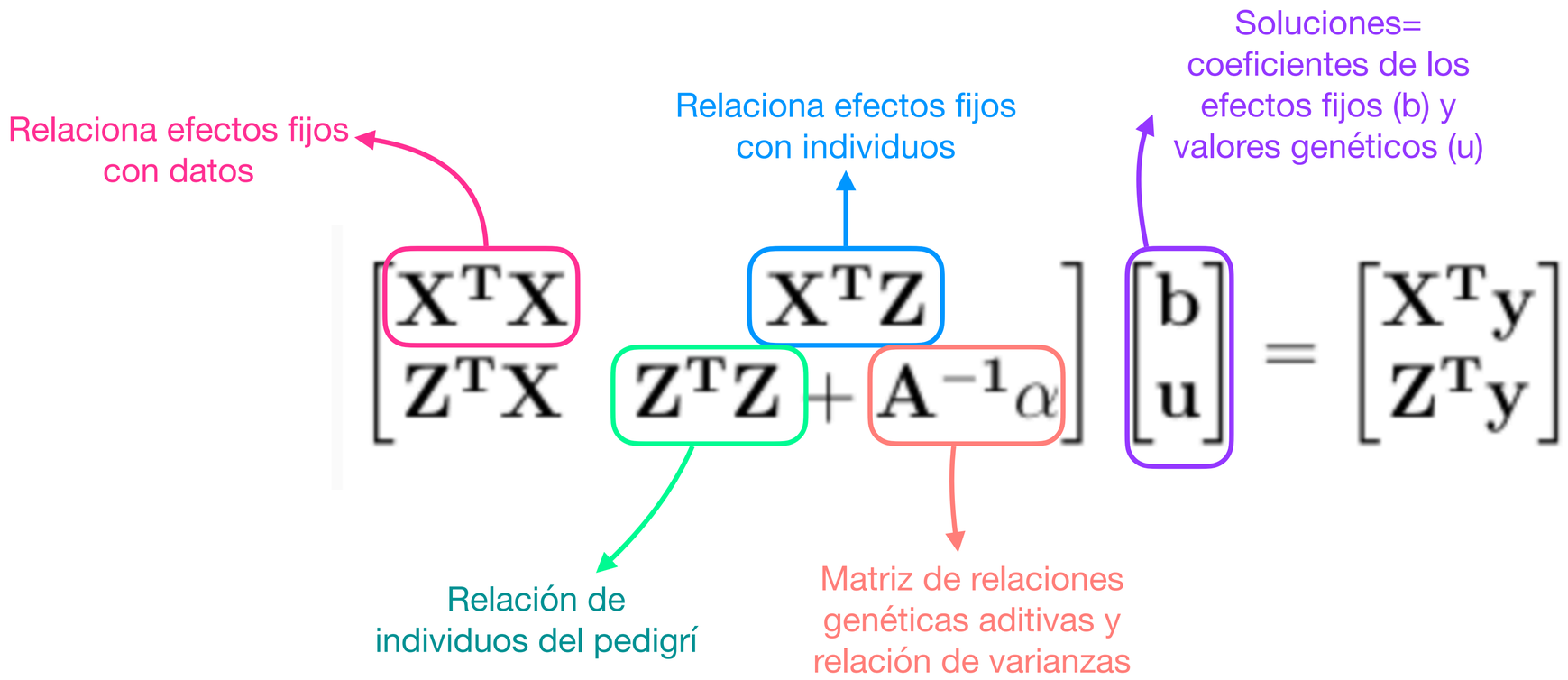
In the Mixed Model Equation form:

$$\begin{bmatrix} \mathbf{X^T X} & \mathbf{X^T Z} \\ \mathbf{Z^T X} & \mathbf{Z^T Z} + \mathbf{A^{-1}}\alpha \end{bmatrix} \begin{bmatrix} \mathbf{b} \\ \mathbf{u} \end{bmatrix} = \begin{bmatrix} \mathbf{X^T y} \\ \mathbf{Z^T y} \end{bmatrix}$$

where 'A' is an additive relationship matrix and alpha is a ratio of the variance components. It can also be written as:

$$\mathbf{LHS} \cdot \mathbf{B} = \mathbf{RHS}$$

Modelo animal



Ejercicio
Actividades

3.2 A Model for an Animal Evaluation (Animal Model)

Example 3.1
Consider the following data set (Table 3.1) for the pre-weaning gain (WWG) of beef calves.

The objective is to estimate the effects of sex and predict breeding values for all animals. Assume that $\sigma_a^2 = 20$ and $\sigma_e^2 = 40$; therefore $\alpha = \frac{40}{20} = 2$.

Table 3.1. Pre-weaning gain (kg) for five beef calves.

Calf	Sex	Sire	Dam	WWG (kg)
4	Male	1	Unknown	4.5
5	Female	3	2	2.9
6	Female	1	2	3.9
7	Male	4	5	3.5
8	Male	3	6	5.0

The model to describe the observations is:

$$y_{ij} = p_i + a_j + e_{ij}$$

where: y_{ij} = the WWG of the jth calf of the ith sex, p_i = the fixed effect of the ith sex, a_j = random effect of the jth calf, and e_{ij} = random error effect. In matrix notation the model is the same as that described in equation [3.1].