

SESSION 19.

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GENETIC EVALUATION OF SPANISH TROTTER BY THRUSTONIAN MODELS



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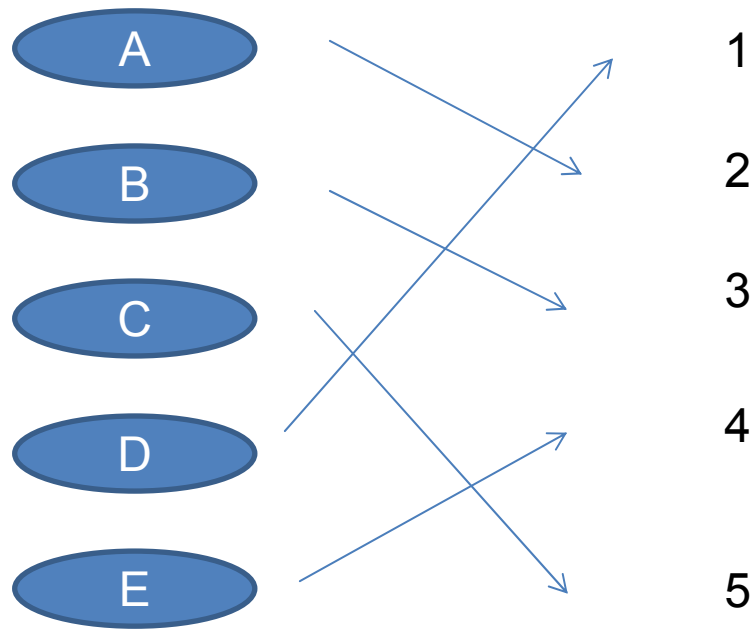
SPANISH TROTTERS

- Trotting races from beginning of 20th century
- Stud-Book founded in 1979
- Breeding scheme approved in 2005
- Until now, genetic evaluation for racing performance using BLUP methodologies
- First reproducers-book published in 2008
- But breeders need more complete and precocious information to optimize the selection program



**OBJECTIVE: DEVELOP NEW GENETIC EVALUATION
PROCEDURES FROM RANKING INFORMATION**

THRUSTONIAN MODELS



Louis Leon Thurstone

Gianola and Simianer, 2006

SPANISH TROTTERS



DATA

- 41,044 records (1990-2006)
- 2,618 horses with data 
- 10,940 individuals on the pedigree 



MODEL OF ANALYSIS

$$\mathbf{l} = \mathbf{Xb} + \mathbf{Tj} + \mathbf{Wp} + \mathbf{Zu} + \mathbf{e}$$

b: Systematic effects (sex, age and race)

j: jockey-trainer

p: individual permanent environmental effects

u: additive genetic effects

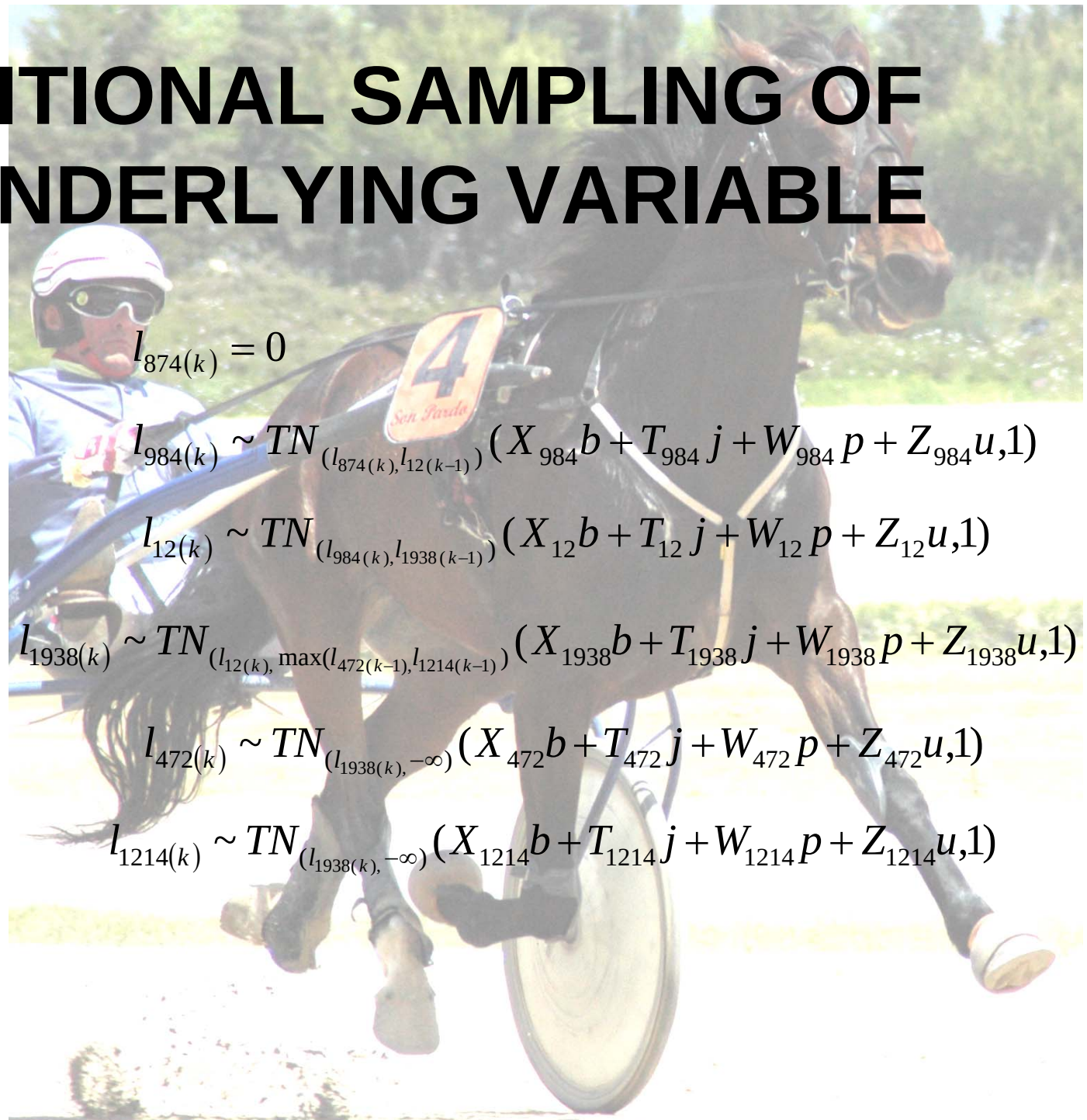
e: residuals

$$\sigma_e^2 = 1$$

BAYESIAN ANALYSIS – GIBBS SAMPLER

CONDITIONAL SAMPLING OF THE UNDERLYING VARIABLE

Horse	Ranking.
874	1
984	2
12	3
1,938	4
472	>4
1,214	>4



$$l_{874(k)} = 0$$

$$l_{984(k)} \sim TN_{(l_{874(k)}, l_{12(k-1)})} (X_{984}b + T_{984}j + W_{984}p + Z_{984}u, 1)$$

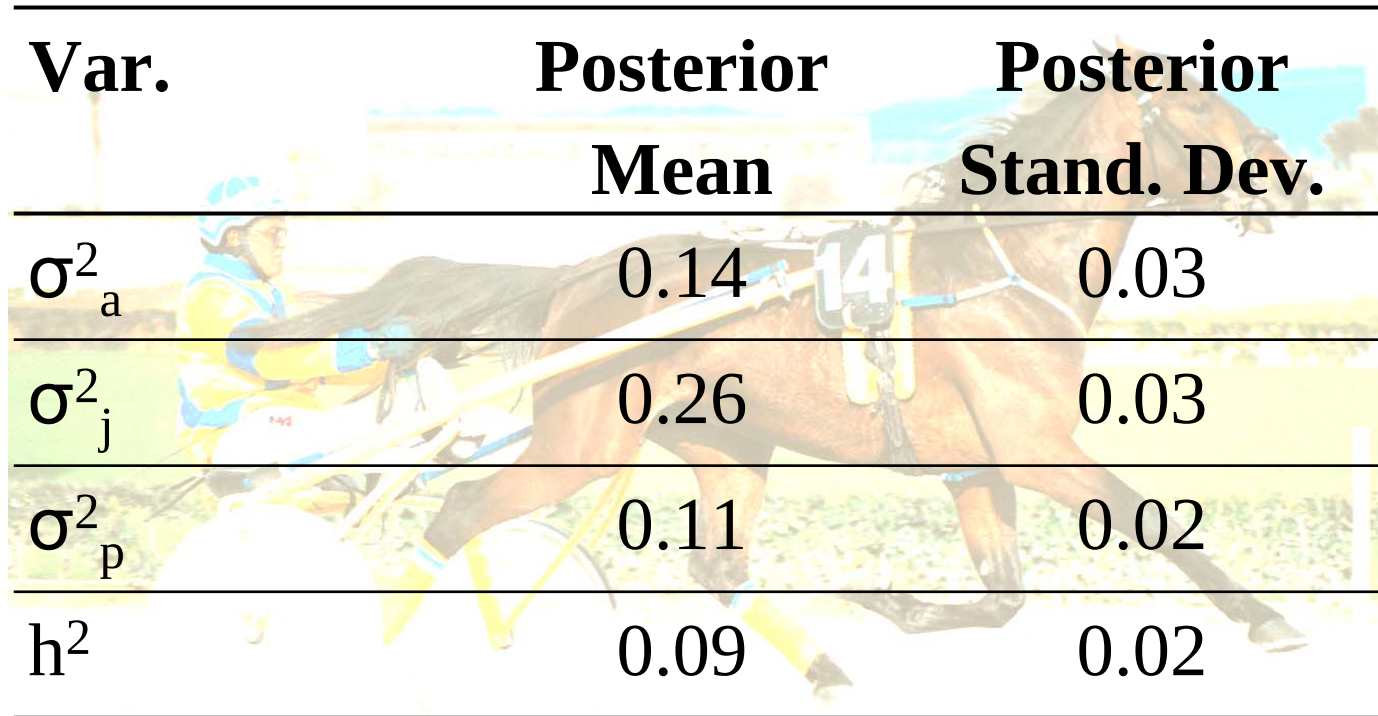
$$l_{12(k)} \sim TN_{(l_{984(k)}, l_{1938(k-1)})} (X_{12}b + T_{12}j + W_{12}p + Z_{12}u, 1)$$

$$l_{1938(k)} \sim TN_{(l_{12(k)}, \max(l_{472(k-1)}, l_{1214(k-1)}))} (X_{1938}b + T_{1938}j + W_{1938}p + Z_{1938}u, 1)$$

$$l_{472(k)} \sim TN_{(l_{1938(k)}, -\infty)} (X_{472}b + T_{472}j + W_{472}p + Z_{472}u, 1)$$

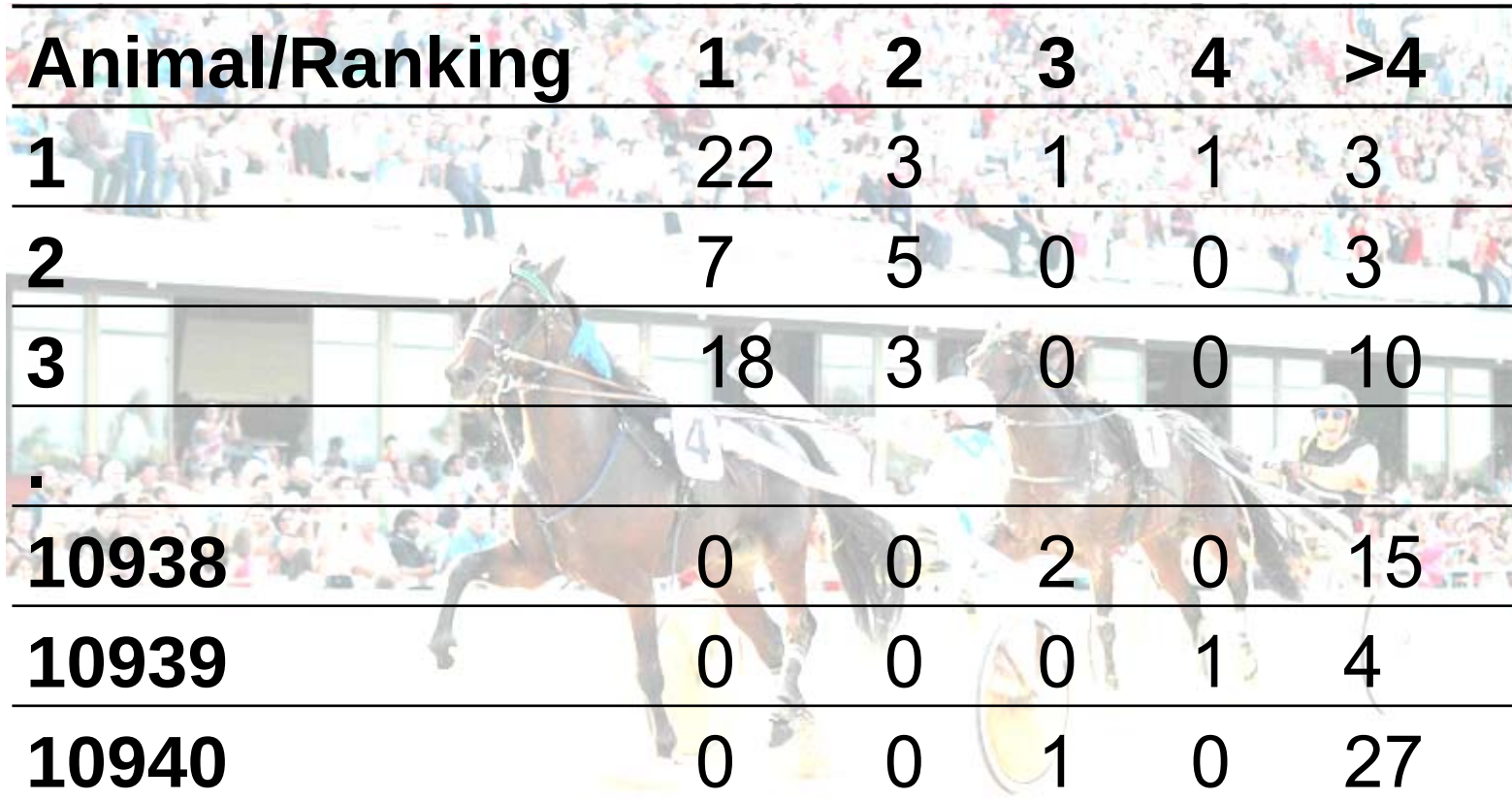
$$l_{1214(k)} \sim TN_{(l_{1938(k)}, -\infty)} (X_{1214}b + T_{1214}j + W_{1214}p + Z_{1214}u, 1)$$

RESULTS

A background image of a horse race. A brown horse with the number 14 on its saddle cloth is running. A jockey in a blue and yellow silks is riding the horse. The background is a blurred racetrack with green grass and a blue sky.

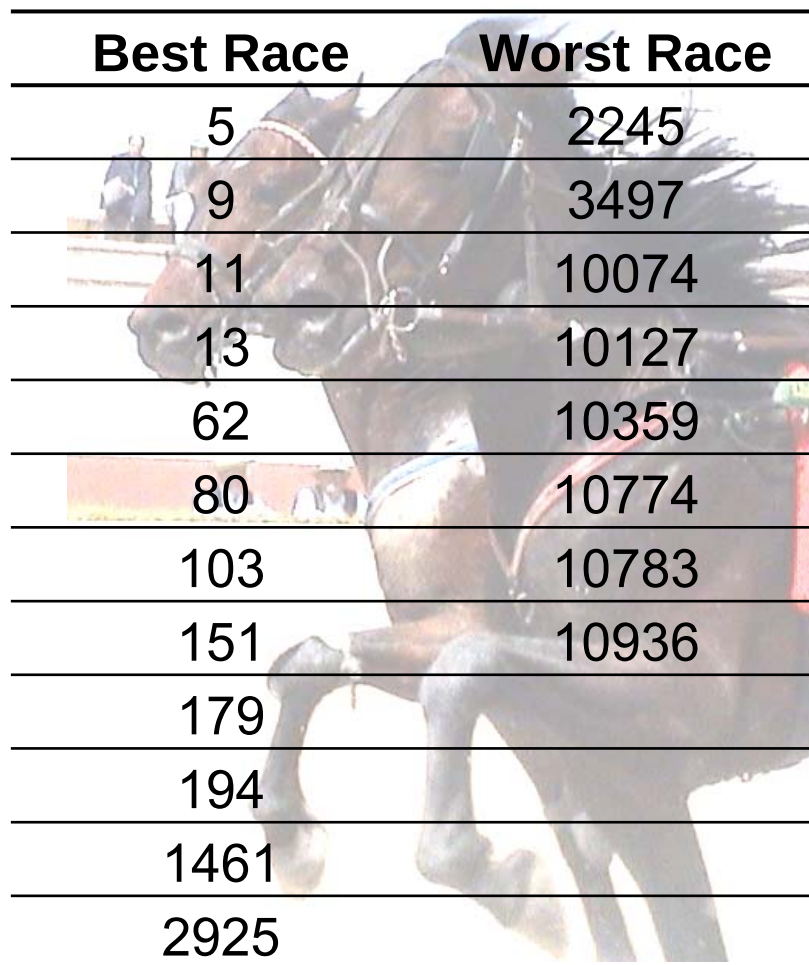
Var.	Posterior Mean	Posterior Stand. Dev.
σ^2_a	0.14	0.03
σ^2_j	0.26	0.03
σ^2_p	0.11	0.02
h^2	0.09	0.02

RESULTS



Animal/Ranking	1	2	3	4	>4
1	22	3	1	1	3
2	7	5	0	0	3
3	18	3	0	0	10
.					
10938	0	0	2	0	15
10939	0	0	0	1	4
10940	0	0	1	0	27

RESULTS



Best Race	Worst Race
5	2245
9	3497
11	10074
13	10127
62	10359
80	10774
103	10783
151	10936
179	
194	
1461	
2925	

APLICACIONES THRUSTONIAN MODELS

- Sensorial Analysis



- Other competitions

ACKNOWLEDGEMENT

