$$y_i \sim Normal(\mu_i, \sigma_R)$$

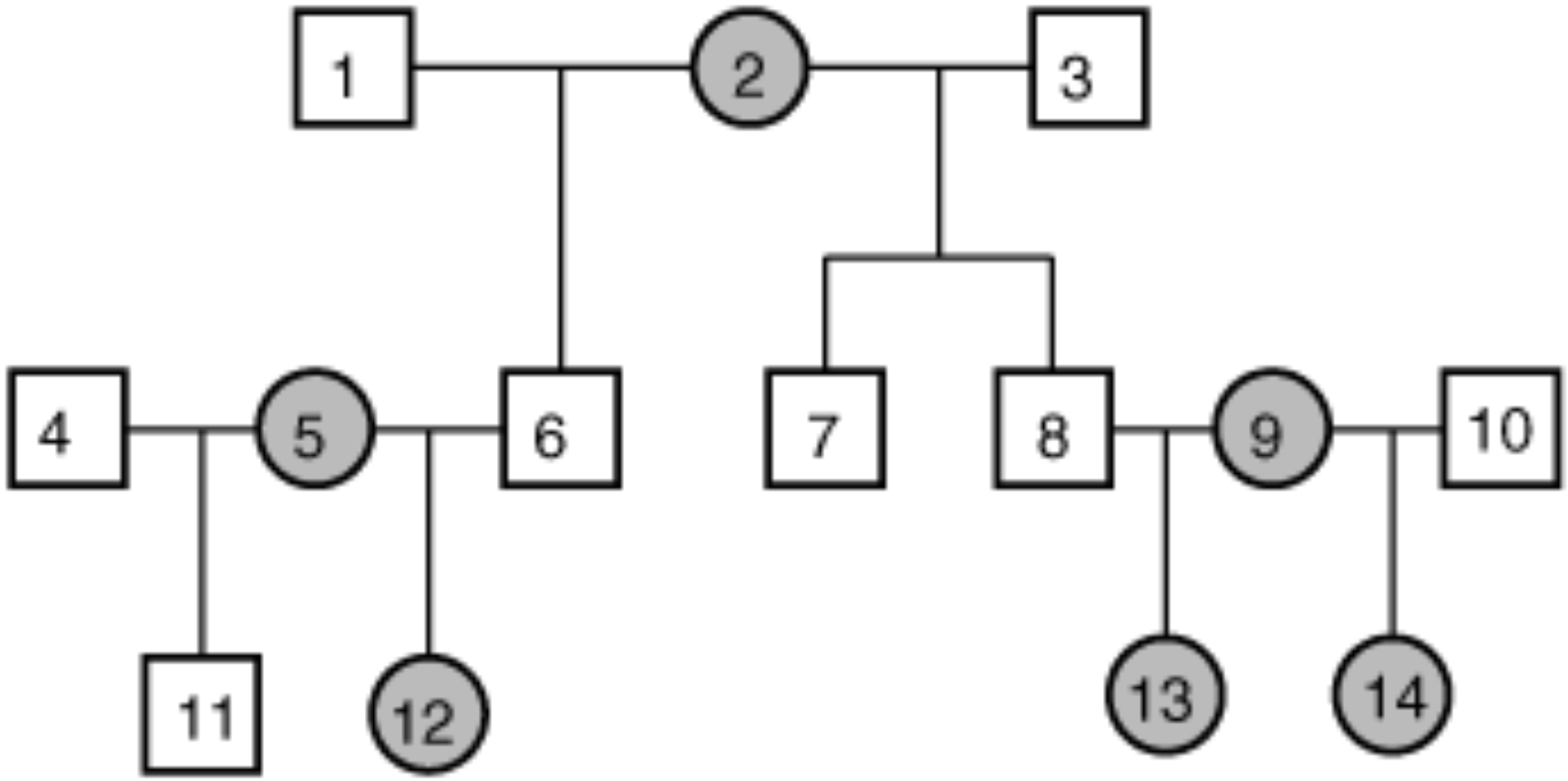
$$\mu_i = \alpha_0 + \alpha_i$$

$$\alpha \sim MVNormal(0, \sigma_G \times A)$$

$$\sigma_G, \sigma_R \sim Exponential(1)$$

EXAMPLE: ANIMAL MODEL

(a)



(b)

$$\mathbf{A} = \begin{pmatrix}
1 & 0 & 0 & 0 & 0 & 0.5 & 0 & 0 & 0 & 0 & 0 & 0.25 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 & 0.5 & 0 & 0 & 0 & 0.25 & 0.25 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0 & 0 & 0.25 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 \\
0.5 & 0.5 & 0 & 0 & 0 & 1 & 0.25 & 0.25 & 0 & 0 & 0 & 0.5 & 0.125 & 0 \\
0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 1 & 0.5 & 0 & 0 & 0 & 0.125 & 0.25 & 0 \\
0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 0.5 & 1 & 0 & 0 & 0 & 0.125 & 0.5 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0.5 \\
0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0 & 0 & 0 & 1 & 0.25 & 0 & 0 \\
0.25 & 0.25 & 0 & 0 & 0.5 & 0.5 & 0.125 & 0.125 & 0 & 0 & 0.25 & 1 & 0.0625 & 0 \\
0 & 0.25 & 0.25 & 0 & 0 & 0.125 & 0.25 & 0.5 & 0.5 & 0 & 0 & 0.0625 & 1 & 0.25 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 1
\end{pmatrix}$$

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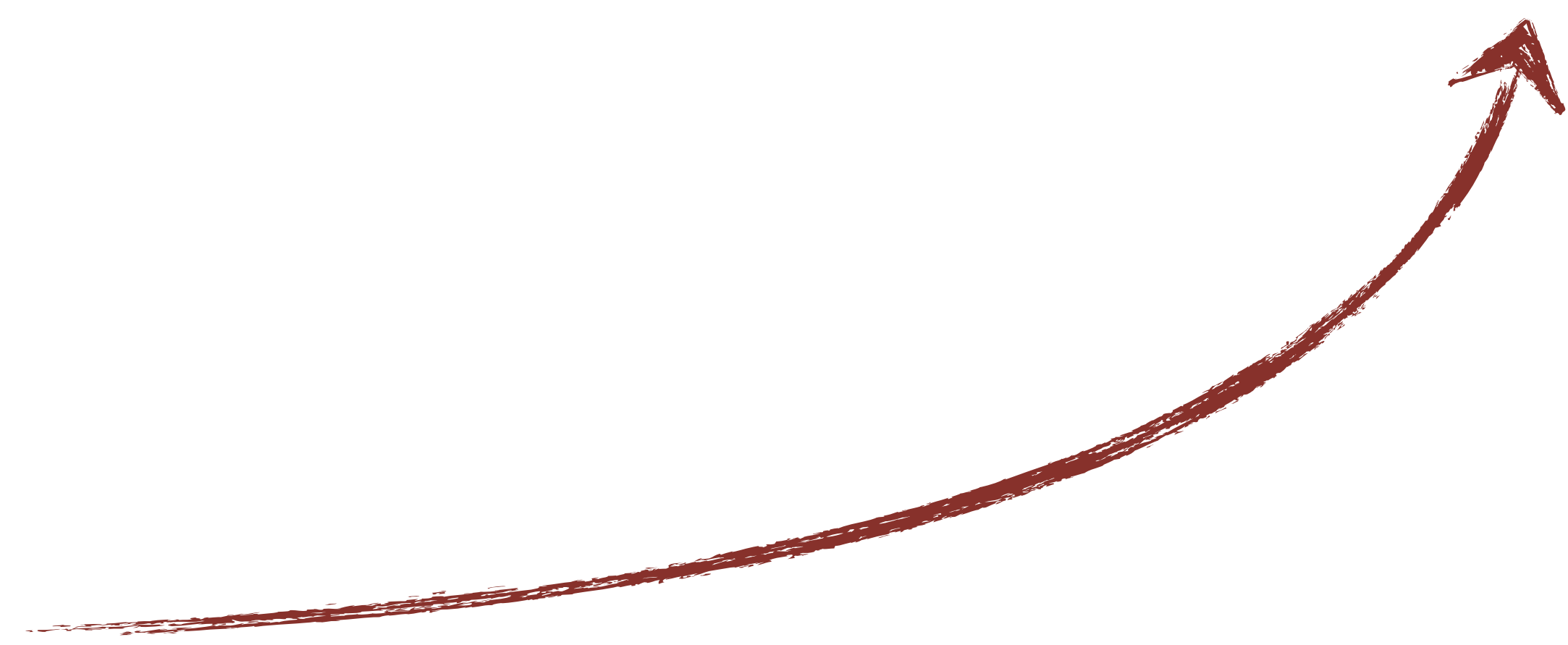
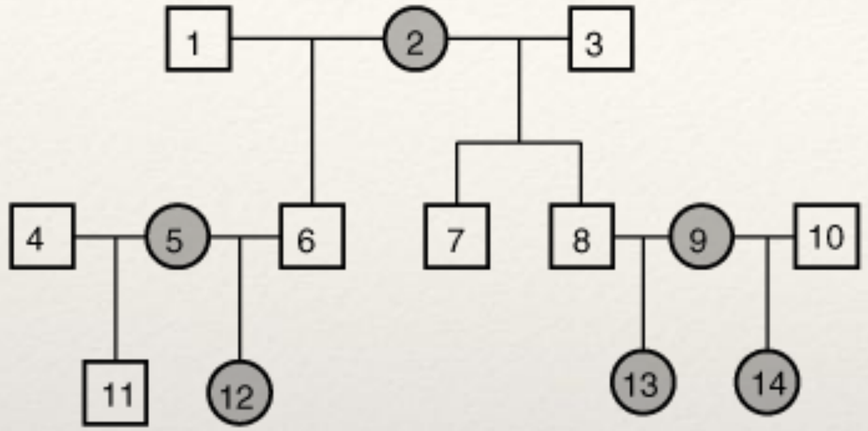
Same thing for the phylogeny or the spacial auto-correlation



EXAMPLE: ANIMAL MODEL

(a)



(b)

$$\mathbf{A} = \begin{pmatrix}
1 & 0 & 0 & 0 & 0 & 0.5 & 0 & 0 & 0 & 0 & 0 & 0.25 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 & 0.5 & 0 & 0 & 0 & 0.25 & 0.25 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0 & 0 & 0.25 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 \\
0.5 & 0.5 & 0 & 0 & 0 & 1 & 0.25 & 0.25 & 0 & 0 & 0 & 0.5 & 0.125 & 0 \\
0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 1 & 0.5 & 0 & 0 & 0 & 0.125 & 0.25 & 0 \\
0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 0.5 & 1 & 0 & 0 & 0 & 0.125 & 0.5 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0.5 & 0.5 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0.5 \\
0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0 & 0 & 0 & 1 & 0.25 & 0 & 0 \\
0.25 & 0.25 & 0 & 0 & 0.5 & 0.5 & 0.125 & 0.125 & 0 & 0 & 0.25 & 1 & 0.0625 & 0 \\
0 & 0.25 & 0.25 & 0 & 0 & 0.125 & 0.25 & 0.5 & 0.5 & 0 & 0 & 0.0625 & 1 & 0.25 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0.5 & 0.5 & 0 & 0 & 0.25 & 1
\end{pmatrix}$$

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$$\mu_i = \alpha_0 + \alpha_i$$
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