

Ratio of non-synonymous over synonymous substitution rates (d_N/d_S)

$$\Delta x^* \gg \Delta x^*$$

$$\ln\left(\frac{1-x}{x}\right)+\ln(19)$$

$$4N_{\rm e}\beta\gamma e^{\beta(\alpha+n\gamma x)}$$

$$\ln\left(\frac{1-x^*}{x^*}\right)+\ln(19)=4N_{\rm e}\beta\gamma e^{\beta(\alpha+Z\gamma x^*)}$$

$$x\rightarrow x'$$

$$s=\frac{W(x')-W(x)}{W(x)}$$

$$\mathbb{P}_{\mathrm{fix}} = \frac{2s}{1-\mathrm{e}^{-4N_{\mathrm{e}}s}}$$

$$x^* = \mathbb{E}\left[x\right]$$

$$\omega = \mathbb{E}\left[2N_{\mathrm{e}}\mathbb{P}_{\mathrm{fix}}\right]$$

$$\chi=\frac{\mathrm{d}\omega}{\mathrm{d}\ln(N_{\mathrm{e}})}$$

$$\vec{P}=\sum_{z=1}^Z\vec{P}_z(\mathbb{S})$$

$$W\left(\vec{P}\right)=\mathrm{e}^{-\alpha\left|\vec{P}\right|^{\beta}}$$

$$\Delta G = G_{\rm F}\left(\mathbb{S}\right) - G_{\rm U}\left(\mathbb{S}\right)$$

$$W\left(\Delta G\right)=\frac{1}{1+e^{\beta\Delta G}}$$