Expected frequency of altruists in the population

$$\mathbb{E}[\bar{X}] = \nu + \delta\ \nu(1-\nu)\ \frac{1-\mu}{\mu}\ (1-Q_{\text{out}})\ \times$$
$$\left(-\mathsf{c} - (\mathsf{b}-\mathsf{c}) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d-1)} \right) \right.$$
$$\left. + \frac{Q_{\text{in}} - Q_{\text{out}}}{1-Q_{\text{out}}} \left[\mathsf{b} - (\mathsf{b}-\mathsf{c})\,(n-1) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d-1)} \right) \right] \right)$$

Expected frequency of altruists in the population

Mutation-drift equilibrium

$$\mathbb{E}[\bar{X}] = \nu + \delta\ \nu(1-\nu)\ \frac{1-\mu}{\mu}\ (1-Q_{\text{out}})\ \times$$
$$\left(-\mathrm{c} - (\mathrm{b}-\mathrm{c}) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d-1)} \right) \right.$$
$$\left. + \frac{Q_{\text{in}} - Q_{\text{out}}}{1-Q_{\text{out}}} \left[\mathrm{b} - (\mathrm{b}-\mathrm{c})\,(n-1) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d-1)} \right) \right] \right)$$

Expected frequency of altruists in the population

Mutation-drift equilibrium

Selection strength

$$\mathbb{E}[\bar{X}] = \nu + \delta\, \nu(1-\nu)\, \frac{1-\mu}{\mu}\, (1 - Q_{\text{out}}) \times \left(-\mathrm{c} - (\mathrm{b}-\mathrm{c}) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d - 1)} \right) + \frac{Q_{\text{in}} - Q_{\text{out}}}{1 - Q_{\text{out}}} \left[\mathrm{b} - (\mathrm{b}-\mathrm{c})\,(n-1) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d - 1)} \right) \right] \right)$$

Expected frequency of altruists in the population

Mutation-drift equilibrium

Selection strength

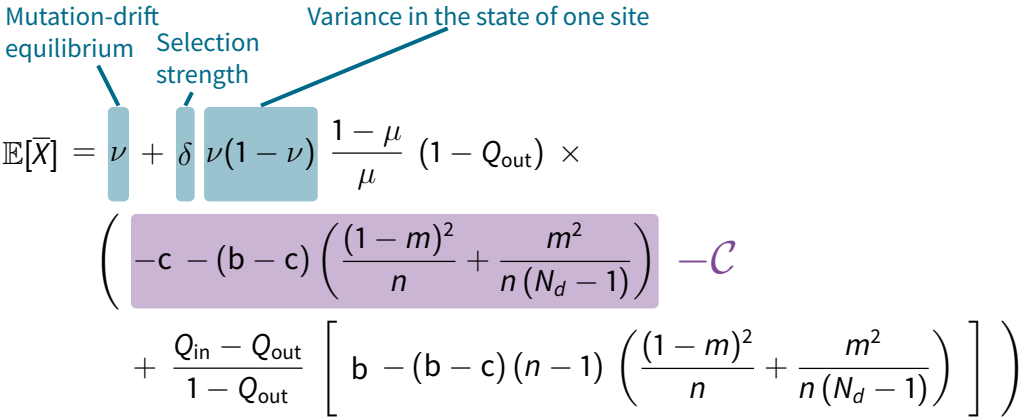
Variance in the state of one site

$$\mathbb{E}[\bar{X}] = \nu + \delta\, \nu(1-\nu)\, \frac{1-\mu}{\mu}\, (1 - Q_{\text{out}}) \times$$

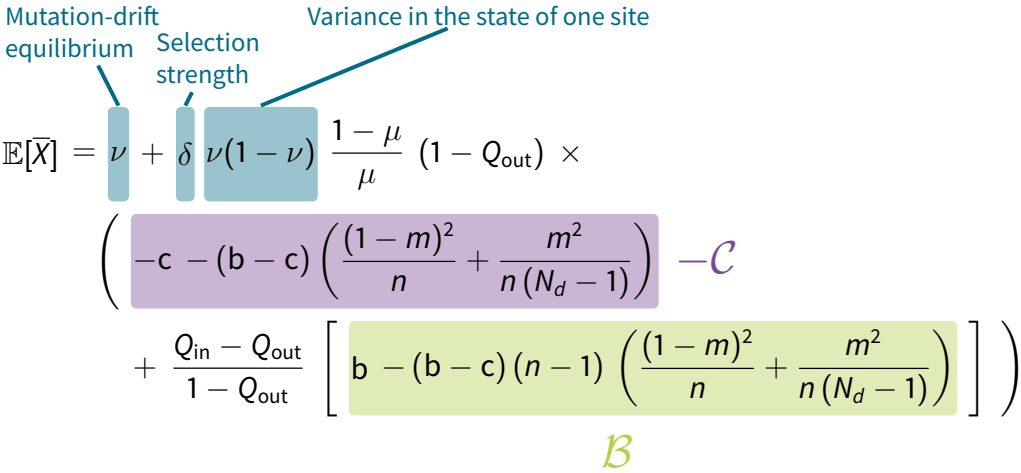
$$\left(-\mathrm{c} - (\mathrm{b}-\mathrm{c}) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d - 1)} \right) \right.$$

$$\left. + \frac{Q_{\text{in}} - Q_{\text{out}}}{1 - Q_{\text{out}}} \left[\mathrm{b} - (\mathrm{b}-\mathrm{c})\,(n-1) \left(\frac{(1-m)^2}{n} + \frac{m^2}{n\,(N_d - 1)} \right) \right] \right)$$

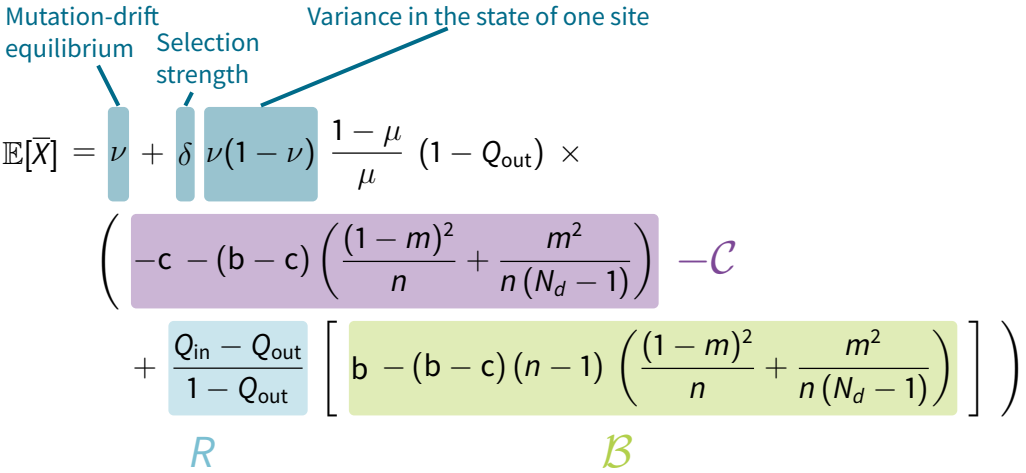
Expected frequency of altruists in the population



Expected frequency of altruists in the population



Expected frequency of altruists in the population



Expected frequency of altruists in the population