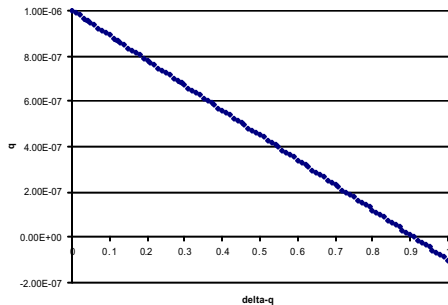


Chapter 7: Solutions to Problems 2-7

$$2. \quad q_e = \frac{u}{u+v}$$

$$q_e = \frac{10^{-6}}{10^{-6} + 10^{-7}} = 0.9091$$



$$p_t = (1-u)^t p_0$$

$$0.95 = (1-10^{-6})^t (0.99)$$

$$\frac{0.95}{0.99} = (1-10^{-6})^t$$

$$\log\left(\frac{0.95}{0.99}\right) = t \log(1-10^{-6})$$

$$t = \frac{\log(0.959596)}{\log(1-10^{-6})} = 41243$$

$$3. \quad \left(\frac{1}{2}\right)^k = \text{probability new mutant in a family of } k \text{ progeny will be lost in 1 generation}$$

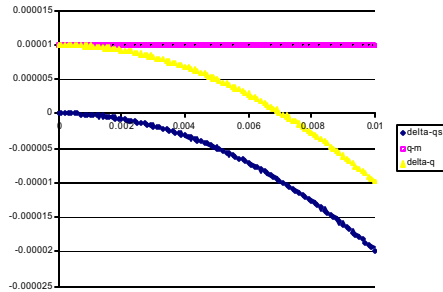
$$\left(\frac{1}{2}\right)^2 = 0.25$$

$$\frac{\left(\frac{1}{2}\right)^0 + \left(\frac{1}{2}\right)^4}{2} = 0.531$$

4.

$$q_e = \left(\frac{u}{s}\right)^{0.5}$$

$$q_e = \left(\frac{10^{-6}}{0.4}\right)^{0.5} = 0.0016$$



6.

$$q_e = \frac{-f + \left[f^2 + 4(1-f)\left(\frac{u}{s}\right)\right]^{0.5}}{2(1-f)} \quad q_e = \frac{u}{fs}$$

$$q_e = \frac{-0.02 + \left[(0.02)^2 + 4(1-0.02)\left(\frac{10^{-5}}{0.1}\right)\right]^{0.5}}{2(1-0.02)} = \frac{0.0081425}{1.96} = 0.00415$$

$$q_e = \frac{10^{-5}}{(0.02)(0.1)} = 0.005$$

$$q_e = \frac{-0.02 + \left[(0.02)^2 + 4(1-0.02)\left(\frac{10^{-5}}{0.2}\right)\right]^{0.5}}{2(1-0.02)} = \frac{0.0044131}{1.96} = 0.00225$$

$$q_e = \frac{10^{-5}}{(0.02)(0.2)} = 0.0025$$

$$q_e = \frac{-0.02 + \left[(0.02)^2 + 4(1-0.02)\left(\frac{10^{-5}}{0.5}\right)\right]^{0.5}}{2(1-0.02)} = \frac{0.0018742}{1.96} = 0.00095$$

$$q_e = \frac{10^{-5}}{(0.02)(0.5)} = 0.001$$

7.

$$H_e \approx \frac{4u}{S}$$

$$H_e \approx \frac{4(10^{-5})}{(0.25)} = 0.00016$$

$$q_e \approx \frac{u(2Ss + 2 - S)}{Ss}$$

$$q_e \approx \frac{10^{-5}[2(0.25)(1) + 2 - 0.25]}{(0.25)(1)} = 0.00009$$

$$q_e = \left(\frac{u}{s}\right)^{0.5}$$

$$q_e = \left(\frac{10^{-5}}{1}\right)^{0.5} = 0.00316, \quad p_e = 1 - 0.00316$$

$$2pq = 2(0.00316)(0.99683) = 0.0063$$