

Homework

1. Calculate the life expectancy for all ages based on the data in Table 4
2. Using the data in Table 4 calculate R_0 , T_G , r and λ .
3. In less than 100 words, explain how stable age distributions and reproductive value are useful data in conservation biology

Hint: Relate their usefulness to their definitions for full credit

①

Age	l_x	M_x	S_{2x}	e_x
0	1	0	0.8	2.14
1	0.8	0	0.7	1.55
2	0.56	1	0.5	1.0
3	0.28	4	0	0.5
4	0	-		

$$e_x = \frac{1}{l_j} \sum_{x=j}^{x=k} (l_{x+1} + l_x) / 2$$

$$e_0 = \frac{1}{l_0} \sum_{x=0}^{x=3} (l_{x+1} + l_x) / 2 = 0.9 + 0.68 + 0.42 + 0.14$$

$$e_1 = \frac{1}{0.8} * \{ 0.68 + 0.42 + 0.14 \} = 1.55$$

$$e_2 = \frac{1}{0.56} * \{ 0.42 + 0.14 \} = 1.0$$

$$e_3 = \frac{1}{0.28} * \{ 0.14 \} = 0.5$$

$$\textcircled{2} R_0 = \sum_x l_x M_x = (1 \times 0) + (0.8 \times 0) + (0.56 \times 1) + (0.28 \times 4) = 1.68$$

$$\textcircled{1} T_G = \frac{\sum_x x l_x M_x}{R_0}$$

$$= \frac{1}{1.68} \times \{ (0 \times 1 \times 0) + (1 \times 0.8 \times 0) + (2 \times 0.56 \times 1) + (3 \times 0.28 \times 4) \}$$

$$= 2.67$$

$$\textcircled{1} r = \frac{\ln(R_0)}{T_G} = \frac{\ln(1.68)}{2.67} = \frac{0.52}{2.67} = 0.1945$$

$$h = R_0^{(1/T_G)} = (1.68)^{\frac{1}{2.67}} = (1.68)^{0.375} = 1.215$$

\textcircled{3} See notes in reading.