SUMMARY OF SECTION 11.18

LET L BE THE MAXIMUM AGE ATTAINED BY ANY FEMALE IN THE POPULATION AND LET N BE A POSITIVE INTEGER. FOR ANY NON-NEGATIVE INTEGER k, LET $T_k = \frac{kL}{N}$.

LET $\vec{X}^{(k)} = \begin{pmatrix} X_1^{(k)} \\ X_2^{(k)} \\ \vdots \\ X_N^{(k)} \end{pmatrix}$ WHERE $X_i^{(k)}$ DENOTES THE NUMBER OF FEMALES BETWEEN $\left[(i-1)\frac{L}{N}, i\frac{L}{N} \right)$ YEARS OF AGE AT TIME T_k.

FOR $i = 1, 2, 3, \ldots, N$ LET A_i BE THE AVERAGE NUMBER OF DAUGHTERS BORN TO EACH FEMALE DURING THE TIME SHE IS BETWEEN $\left[(i-1)\frac{L}{N}, i\frac{L}{N} \right)$ YEARS OF AGE.

FOR $i = 1, 2, 3, \ldots, N-1$ LET B_i BE THE FRACTION OF FEMALES BETWEEN $\left[(i-1)\frac{L}{N}, i\frac{L}{N} \right)$ YEARS OF AGE THAT CAN BE EXPECTED TO SURVIVE AND PASS INTO THE CLASS BETWEEN $\left[i\frac{L}{N}, (i+1)\frac{L}{N} \right)$.

NOTE THAT $A_i \geqslant 0$ AND $0 < B_i \leqslant 1$.

LET $L = \begin{bmatrix} A_1 & A_2 & A_3 & \cdots & A_{N-1} & A_N \\ B_1 & 0 & 0 & \cdots & 0 & 0 \\ 0 & B_2 & 0 & \cdots & 0 & 0 \\ \vdots & & & & & \\ 0 & 0 & 0 & \cdots & B_{N-1} & 0 \end{bmatrix}$ ⟵ THE LESLIE MATRIX

ASSUMING NO IMMIGRATION/EMMIGRATION $\vec{X}^{(k+1)} = L \, \vec{X}^{(k)}$