__THM 1__ – L HAS EXACTLY 1 POSITIVE EIGENVALUE λ_1

WITH EIGEN VECTORS $T \begin{pmatrix} 1 \\ B_1/\lambda_1 \\ B_1 B_2/\lambda_1^2 \\ \vdots \\ B_1 B_2 \cdots B_{N-1}/\lambda_1^{N-1} \end{pmatrix}$

__THM 2__ – ANY OTHER EIGENVALUE OF L, SAY λ_K, SATISFIES

$|\lambda_K| \leq \lambda_1$

__THM 3__ – IF TWO SUCCESSIVE ENTRIES A_i AND A_{i+1} ARE NON-ZERO, THEN $|\lambda_K| < \lambda_1$ FOR ANY OTHER EIGENVALUE λ_K.

IN THIS CASE $\vec{X}^{(K)} \simeq \lambda_1 \vec{X}^{(K-1)}$ FOR LARGE K.

ALSO $\vec{X}^{(K)} \simeq C \lambda_1^K \begin{pmatrix} 1 \\ B_1/\lambda_1 \\ B_1 B_2/\lambda_1^2 \\ \vdots \\ B_1 B_2 \cdots B_{N-1}/\lambda_1^{N-1} \end{pmatrix}$ FOR SOME POSITIVE CONSTANT C.

THE NET REPRODUCTION RATE $R = A_1 + A_2 B_1 + A_3 B_1 B_2 + \cdots + A_N B_1 \cdots B_{N-1}$.

λ_1 WILL EQUAL 1 $\iff R = 1$. THIS CORRESPONDS TO ZERO POPULATION GROWTH.