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Q.

5.2. A is symmetric indefinite tridiagonal

Algorithm: $A := UDU^T\_TRI(A)$

Partition $A \rightarrow \left(\begin{array}{c|c|c} A_{FF} & \alpha_{FM} e_L^T & 0 \\ \hline * & \alpha_{MM} & \alpha_{ML} e_F^T \\ \hline * & * & A_{LL} \end{array}\right)$

where A_{LL} is 0×0

while $m(A_{LL}) < m(A)$ do

Repartition: $\left(\begin{array}{c|c|c|c} A_{00} & \alpha_{01} e_L & 0 & 0 \\ \hline * & \alpha_{11} & \alpha_{12} & 0 \\ \hline * & * & \alpha_{22} & \alpha_{23} e_F^T \\ \hline * & * & * & A_{33} \end{array}\right)$

~~$\alpha_{01} e_L :=$~~ $\alpha_{01} e_L := \begin{pmatrix} 0 \\ \alpha_{01} \end{pmatrix}$

From solution 5.1, we know

$\alpha_{01} := \alpha_{01} / \alpha_{11}$

Relative to 5.1, here $a_{01} = \alpha_{01} e_L := \begin{pmatrix} 0 \\ \alpha_{01}/\alpha_{11} \end{pmatrix}$

Calculation:

$A_{00} := A_{00} - \alpha_{11} \alpha_{01} \alpha_{01}^T$

$\therefore$ Applying to $UDU^T\_TRI(A)$:

$A_{00} := \left(\begin{array}{c|c} A_{00} & \alpha_{01} e_L \\ \hline * & \alpha_{11} \end{array}\right) - \alpha_{11} \begin{pmatrix} 0 \\ \alpha_{01} \end{pmatrix} \begin{pmatrix} 0 \\ \alpha_{01} \end{pmatrix}^T$

$$:= \left(\begin{array}{c|c} A_{00} & \alpha_{01} e_L \\ \hline 0 & \alpha_{11} \end{array}\right) - \begin{pmatrix} 0 & 0 \\ 0 & \alpha_{11}\alpha_{01}^2 \end{pmatrix}.$$

$$= \left(\begin{array}{c|c} A_{00} & \alpha_{01} e_L \\ \hline 0 & \alpha_{11} - \alpha_{11}\alpha_{01}^2 \end{array}\right).$$

$$\therefore \alpha_{11} := \alpha_{11} - \alpha_{11}\alpha_{01}^2.$$

$$\alpha_{21} := \alpha_{21} / \alpha_{11}$$

Continue:

$$\left(\begin{array}{c|c|c} A_{FF} & \alpha_{FM} e_L & 0 \\ \hline x & \alpha_{MM} & \alpha_{ML} e^T_F \\ \hline x & x & A_{LL} \end{array}\right).$$

$\frac{dx}{dy}$