

2) Exercise 5.2: Derive alg. given symmetric indefinite tridiagonal matrix A , computes $A = UDU^T$. Overwrite only upper triangular part of A . Show how you came up with alg.

Option 1:

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

$$\alpha_{00} := \alpha_{00} - \lambda_{01} \alpha_{01}$$

$$\alpha_{01} := \lambda_{01}$$

Option 2:

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

$$\alpha_{00} := \alpha_{00} - \alpha_{11} \alpha_{01}^2$$

Option 3:

$$\alpha_{00} := \alpha_{00} - \frac{1}{\alpha_{11}} \alpha_{01}^2$$

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

• Partition $A \rightarrow \left(\begin{array}{c|c} A_{00} & \alpha_{01} e_1 \\ \hline \alpha_{01} e_1^T & \alpha_{11} \end{array} \right)$

• $\alpha_{11} = \alpha_{11}$ (no-op)

• Compute $\lambda_{01} = \alpha_{01} / \alpha_{11}$

• Update $\alpha_{00} := \alpha_{00} - \lambda_{01} \alpha_{01}$

• $\alpha_{01} := \lambda_{01}$

• Continue with computing $A_{00} \rightarrow U_{00} D_{00} U_{00}^T$