

Warm-up

12/04/2006

Math 2270, Fall 2006

TRUE or FALSE?

Problem 1. The equation $A^T A = A A^T$ holds for all square matrices A .

False : $A = \begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$ $A^T = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

$$A A^T = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} ; \quad A^T A = \begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}.$$

Problem 2. If A is indefinite, then 0 must be an eigenvalue of A .

False: $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ $\lambda_1 = 1, \lambda_2 = -1$

so A is indefinite.

$q(x_1, x_2) = x_1^2 - x_2^2$ takes positive
and negative values.