Lab Book 7c

$A \in \mathbb{R}^{m,n}$ $m\{[\underbrace{\quad}_{n}]$ $n\{[\underbrace{\quad}_{m}]$ A^T

$$A^T \cdot A = \begin{bmatrix} A_{11} & \cdots & A_{m1} \\ \vdots & A_{22} & \\ & \ddots & \\ A_{1n} & & A_{mn} \end{bmatrix} \cdot \begin{bmatrix} A_{11} & \cdots & A_{1n} \\ \vdots & A_{22} & \ddots \\ A_{m1} & & A_{mn} \end{bmatrix}$$

identity trace $(A^T A) = \sum_1^m A_{i1}^2 + \sum_1^m A_{i2}^2 + \cdots + \sum_1^m A_{in}^2$

$$= \sum_{i=1}^{m} \sum_{j=1}^{n} A_{ij}^2$$