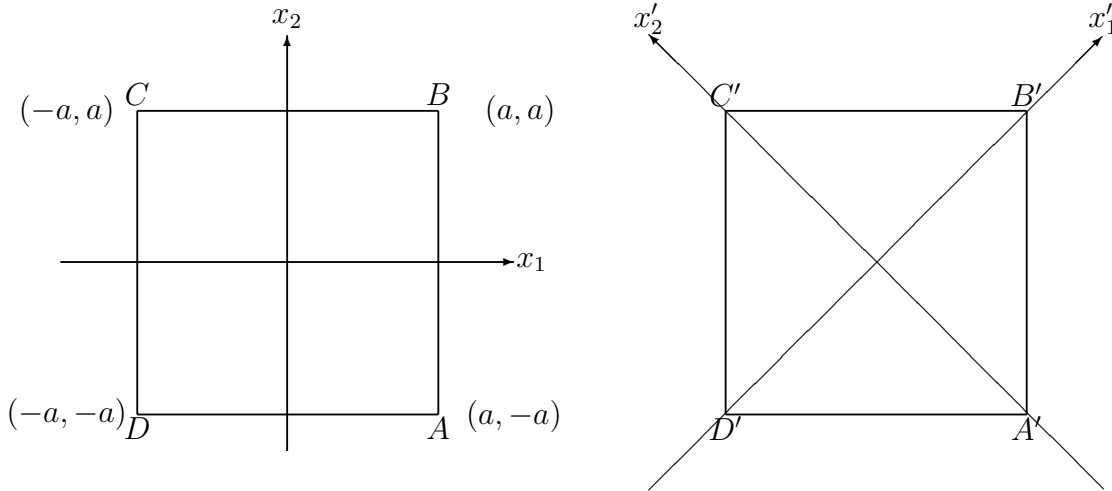


Scalar, Vector and Tensor



x_1-x_2 coordinate system $x'_1-x'_2$ coordinate system

- (1). Scalar transformation

$$c = c$$

- (2). If a vector can be expressed by (v_1, v_2) and (v'_1, v'_2) in $x_1 - x_2$ and $x'_1 - x'_2$ coordinate system, respectively, find the matrix T if

$$\begin{bmatrix} v'_1 \\ v'_2 \end{bmatrix} = [T] \begin{bmatrix} v_1 \\ v_2 \end{bmatrix}$$

where

$$[T] = \begin{bmatrix} \cos(\theta) & \sin(\theta) \\ -\sin(\theta) & \cos(\theta) \end{bmatrix}$$

- (3). If moment of inertia can be expressed by $I_{11}, I_{12}, I_{21}, I_{22}$ and $I_{1'1'}, I_{1'2'}, I_{2'1'}, I_{2'2'}$ in $x_1 - x_2$ and $x'_1 - x'_2$ coordinate system, respectively, find the matrix A if

$$\begin{bmatrix} I_{1'1'} & I_{1'2'} \\ I_{2'1'} & I_{2'2'} \end{bmatrix} = [T]^t \begin{bmatrix} I_{11} & I_{12} \\ I_{21} & I_{22} \end{bmatrix} [T]$$