LINEAR ALGEBRA AND ITS APPLICATIONS
UE19MA251

PES UNIVERSITY ONLINE

Transformations Represented by Matrices

Rotation Matrices Q:

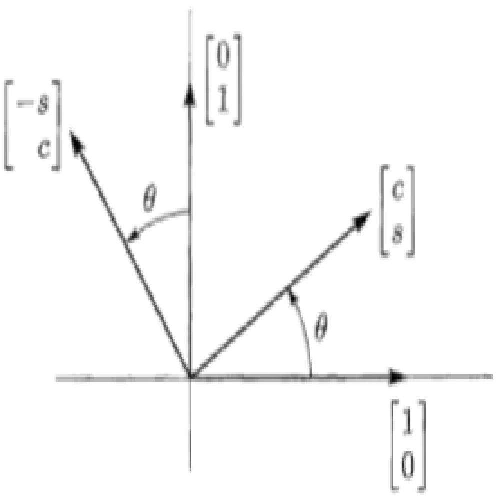
The matrix that rotates (left) every point in R^2 about origin through θ is given by

$$Q_\theta = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

This transformation is invertible since the matrix has an inverse.

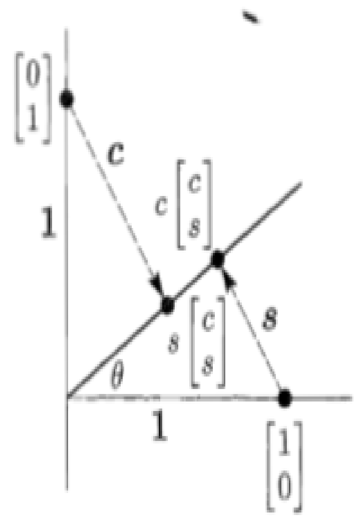
A rotation through –θ brings back the original.

Transformations Represented by Matrices



$$R = \begin{bmatrix} c & -s \\ s & c \end{bmatrix}$$

$$P = \begin{bmatrix} c^2 & cs \\ cs & s^2 \end{bmatrix}$$



Transformations Represented by Matrices

Projection Matrices P

The matrix that projects every vector in R^2 onto any θ line is given by

$$P = \begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix}$$

This matrix has no inverse , because the transformation has no inverse.

Projecting twice is the same as projecting once.

A projection matrix equals its own square.

THANK YOU