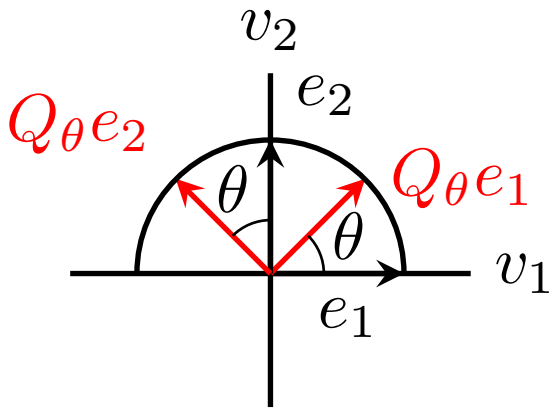
A Rotation Matrix

What matrix Q_θ represents (by multiplication) a θ radians counter-clockwise rotation in the plane $\mathbb{R}^2$?
We need to determine the value of multiplying Q_θ times the standard basis vectors e_1 and e_2. Setting $c = \cos\theta, s = \sin\theta$, trigonometry gives us:



$$Q_\theta e_1 = Q_\theta \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} c \\ s \end{bmatrix}$$

$$Q_\theta e_2 = Q_\theta \begin{bmatrix} 0 \\ 1 \end{bmatrix} = \begin{bmatrix} -s \\ c \end{bmatrix}$$

Therefore

$$Q_\theta v = Q_\theta (v_1 \begin{bmatrix} 1 \\ 0 \end{bmatrix} + v_2 \begin{bmatrix} 0 \\ 1 \end{bmatrix}) = v_1 Q_\theta \begin{bmatrix} 1 \\ 0 \end{bmatrix} + v_2 Q_\theta \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$= v_1 \begin{bmatrix} c \\ s \end{bmatrix} + v_2 \begin{bmatrix} -s \\ c \end{bmatrix} = \begin{bmatrix} c & -s \\ s & c \end{bmatrix} v$$