Rotation Dilation Matrices

A rotation and dilation can be done like so:

$$\begin{bmatrix} r & 0 \\ 0 & r \end{bmatrix} \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

More generally, any such matrix is a rotation dilation matrix:

$$\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$$

For this the eigenvalues will work out to be $a \pm ib$ or in polar form $r(\cos\theta \pm \sin\theta)$. Where $r^2 = a^2 + b^2$ and θ is the angle of rotation ($\tan\theta = \frac{b}{a}$).