

1. The matrix $A = \begin{bmatrix} 5 & -2 \\ 1 & 3 \end{bmatrix}$ has complex eigenvalues, find the eigenvalues, eigenvectors and the matrices P and C (of the form $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$) so that $A = PCP^{-1}$

2. Find the stochastic matrix and the steady state vector.

A collection of avid movie fans go every week to "Movies π " which always has a comedy, a drama and a foreign film.

- (a) A person seeing the comedy this week, will next week see a comedy with probability 0.7, a drama with probability 0.0 and a foreign film otherwise.
- (b) A person seeing the drama this week, will next week see a comedy with probability 0.2, a drama with probability 0.2 and a foreign film otherwise.
- (c) A person seeing the foreign film this week, will next week see a comedy with probability 0.2, a drama with probability 0.4 and a foreign film otherwise.