

Each group only needs to submit ONE file containing your solutions!

Problem 1. (1) Compute e^{tA} for

$$A = \begin{pmatrix} 3 & 5 \\ 1 & -1 \end{pmatrix}$$

(by any method you prefer)

(2) Consider an initial value problem for $\frac{dx}{dt} = Ax$ with the initial condition $\mathbf{x}(0)$ being an eigenvector of A . What is the behavior of $\mathbf{x}(t)$ as $t \rightarrow \infty$? (going to infinity or going to zero or anything else). Do this for both eigenpairs.

(3) Repeat part (2) with the initial condition

$$\mathbf{x}(0) = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

Problem 2. Repeat Problem 1 with the matrix

$$A = \begin{pmatrix} 3 & 1 \\ 1 & 3 \end{pmatrix}$$