

## Reading Questions

### Example 7.4.2

1. The limit of a matrix is the limit of its entries.
2. If the  $n \times n$  matrix  $A$  is diagonalizable then  $A^t$  is a diagonal matrix for some positive integer  $t$ .
3. I have used Cocalc on at least one of my homework assignments.
4. Do you have any questions about Cocalc? If so, what are your questions?

## Section 7.4 More on Dynamical Systems (Part 1)

### Definitions

- P 1.** Give two different examples of a distribution vector.
- P 2.** Give an example of a positive transition matrix.
- P 3.** Suppose  $\vec{x}, \vec{v}_1, \vec{v}_2, \dots, \vec{v}_n$  are distribution vectors. Let the columns of  $A$  are the vectors  $\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n$ . Is  $A\vec{x}$  a distribution vector. Explain your answer.
- P 4.** What can you say about the columns of the matrix  $A^t$  where  $A$  is the matrix from the previous problem and  $t$  is a positive integer?

### Dynamical System

**P 5.** Let  $A = \begin{bmatrix} 0.8 & 0.6 \\ 0.2 & 0.4 \end{bmatrix}$ .

1. Use the example in today's lecture to find the closed formula for  $A^t$  where  $t$  is an arbitrary positive integer.

2. Find  $\lim_{t \rightarrow \infty} A^t$ .

3. Compute  $\lim_{t \rightarrow \infty} A^t \begin{bmatrix} 0.5 \\ 0.5 \end{bmatrix}$ .