**Math 220  
5.4-6: Dynamical Systems  
Questions for flipped class**

**Important terms**Multiply right to left

Matrix powers and dynamical systems

**Feel the power!**

(5.4.1)

Suppose  and . Find a closed-form expression for  by first writing  in terms of the eigenbasis.

**Fight the Power**

(5.4.2) Suppose we have the transition matrix and initial state . Find a closed-form expression for  and then find the steady-state/equilibrium vector .

**Could things get more complex?**

(5.4.3) Sketch phase portraits for the previous two questions that account for their eigenvalues and eigenvectors. How would we describe each dynamical system?

(5.4.4) Suppose , find invertible *P* and rotation-scaling matrix *C* such that . What is the scaling factor and what is the angle (in degrees) of the rotation.

(5.4.5) Suppose  and  where  and .

Find a new invertible *P* and rotation-scaling matrix *C* such that . What is the scaling factor and what is the angle (in degrees) of the rotation.

Sketch the rough trajectory of  if 

(5.4.1 solution)

A math equations and formulas

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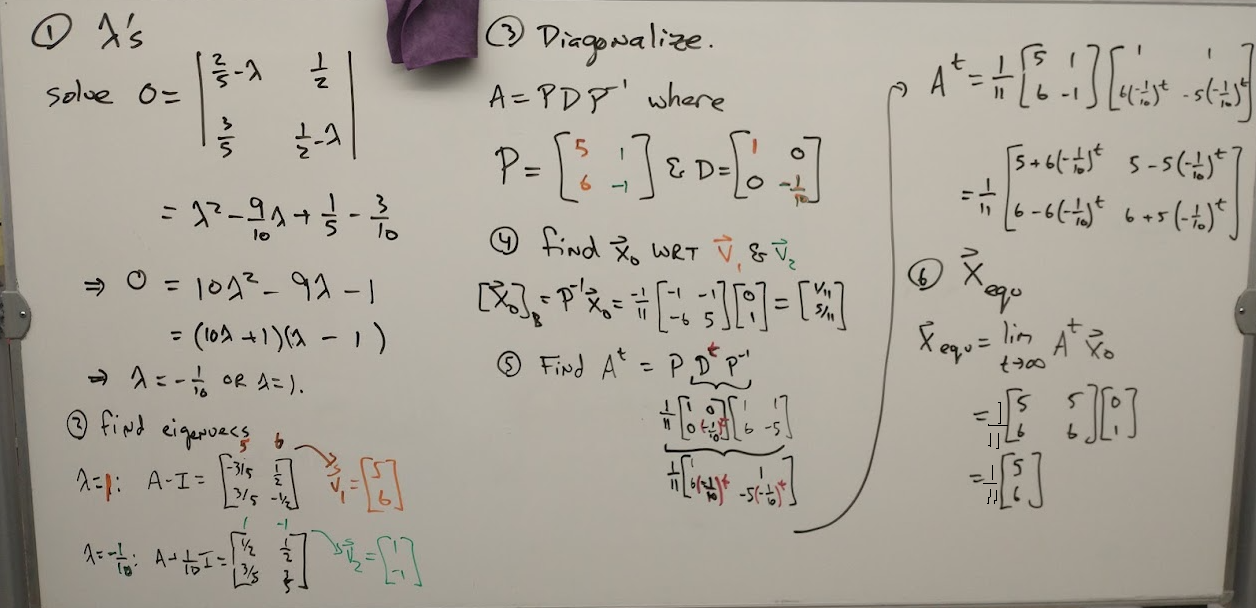
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(5.4.2 solution)

A math problem with numbers and equations

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(5.4.3 solution)

A diagram of a graph

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(5.4.4 solution)

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(5.4.5 solution)