

Question 1

Not complete

Points out of 8.00

Use these questions as a way to review and solidify the language of linear algebra as well as computations and conceptual understanding. If you are stuck, use ASU Learn resources and your notes to help you. I'm also happy to help in office hours.

Write all responses in your notes since you'll be comparing them with the re-engage later.

In Maple, I input

with(LinearAlgebra): M:=Matrix([[1/2,0,0],[1,1/3,0],[0,1,2]]): [Eigenvectors](#)(M);

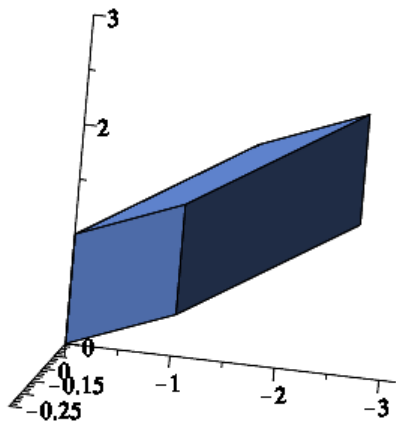
and obtain $\begin{bmatrix} 2 \\ \frac{1}{3} \\ \frac{1}{2} \end{bmatrix}$, $\begin{bmatrix} 0 & 0 & -\frac{1}{4} \\ 0 & -\frac{5}{3} & -\frac{3}{2} \\ 1 & 1 & 1 \end{bmatrix}$.

First, using the cofactor/[Laplace expansion](#) method, calculate by hand the [determinant](#) of the 3×3 matrix of [eigenvectors](#). Show work in your notes.

When you are finished, type Laplace in the box

Next, here is a plot of the parallelepiped of the [eigenvectors](#) $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 0 \\ -\frac{5}{3} \\ 1 \end{bmatrix}$, and $\begin{bmatrix} -\frac{1}{4} \\ -\frac{3}{2} \\ 1 \end{bmatrix}$ with the $-x$ axis sticking out of the computer screen,

the z axis pointed up, and the $-y$ axis to the right! What is the volume of the parallelepiped formed by these [eigenvectors](#)? Respond in your notes.



When you are finished, type volume in the box

Why do these 3 [eigenvectors](#) [span](#) all of \mathbb{R}^3 ? Respond in your notes.

When you are finished, type [span](#) in the box

Now that you have argued why the [eigenvectors span](#) all of \mathbb{R}^3 , in your notes, write the [eigenvector decomposition](#) for a dynamical system with the same state matrix M , [eigenvalues](#), and [eigenvectors](#) as above.

When you are finished, type decomposition in the box

What happens in the long run to populations on the $t \begin{bmatrix} 0 \\ -\frac{5}{3} \\ 1 \end{bmatrix}$ [line](#)? Respond in your notes.

When you are finished, type [eigenvector](#) in the box

What happens in the long run to populations with starting positions on the z-axis? Respond in your notes.

When you are finished, type populations in the box

What happens in the long run to populations for most starting positions? Respond in your notes.

When you are finished, type limit in the box

In your notes, sketch a [trajectory](#) diagram in 3-space with a starting position not on any of the 3 [eigenvectors](#).

When you are finished, type [trajectory](#) in the box

Check

Question **2**

Not complete

Points out of 4.00

In your notes, list a few examples of important algebraic operations and properties in 2240.

When you are finished, type algebraic in the box

In your notes, list a few examples of important visualizations in 2240.

When you are finished, type visualizations in the box

In your notes, list a few examples of real-life applications that we have looked at.

When you are finished, type applications in the box

It should hopefully be fairly clear why algebra, geometry and applications are a focus of this course but why do you think critical reasoning and analysis is also one of the focuses? Respond in your notes.

When you are finished, type analysis in the box

Check

[◀ debrief 3.1, 3.2, 3.3, 5.1, 5.2, 5.6](#)

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