Lecture 11

Vectors

Table of Contents

1) What is a vector?

2) Scalar projection

3) Parametrized lines

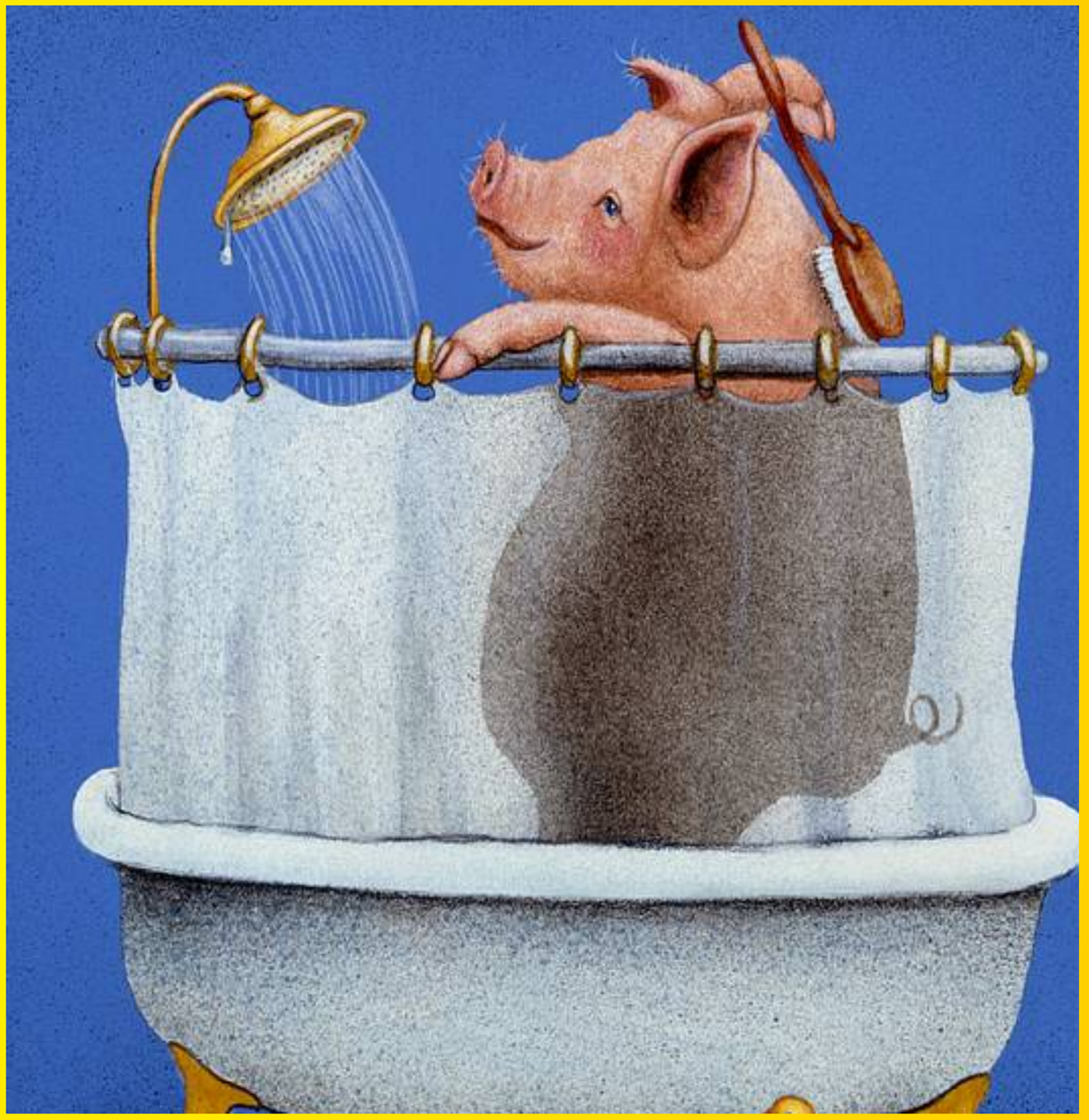
4) Is space a continuum?

5) Worksheet problems

What is a vector?

A quantity with magnitude and direction?

Hog wash!

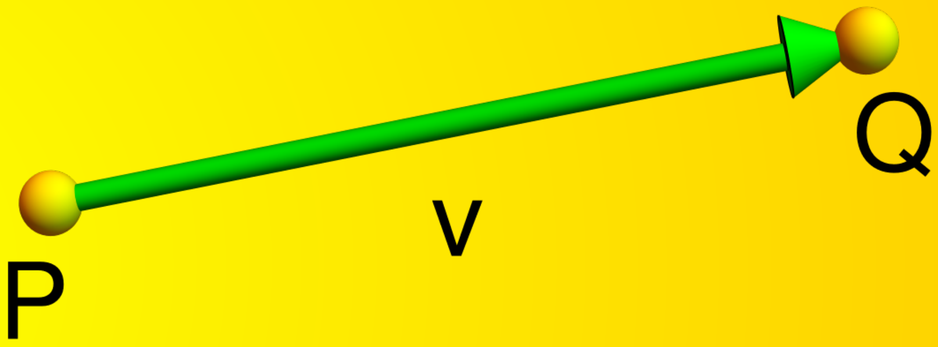


A movie is a vector because it has a magnitude and direction !

<0,0,0> is not a vector with that definition because it has no direction.

In reality, <0,0,0> is a very important vector.

What is a vector?



Two points like
P=(1,1,1),Q=(3,4,5)
define a vector ⟨2,3,4>

Notation

$$\vec{i} = \langle 1,0,0 \rangle$$

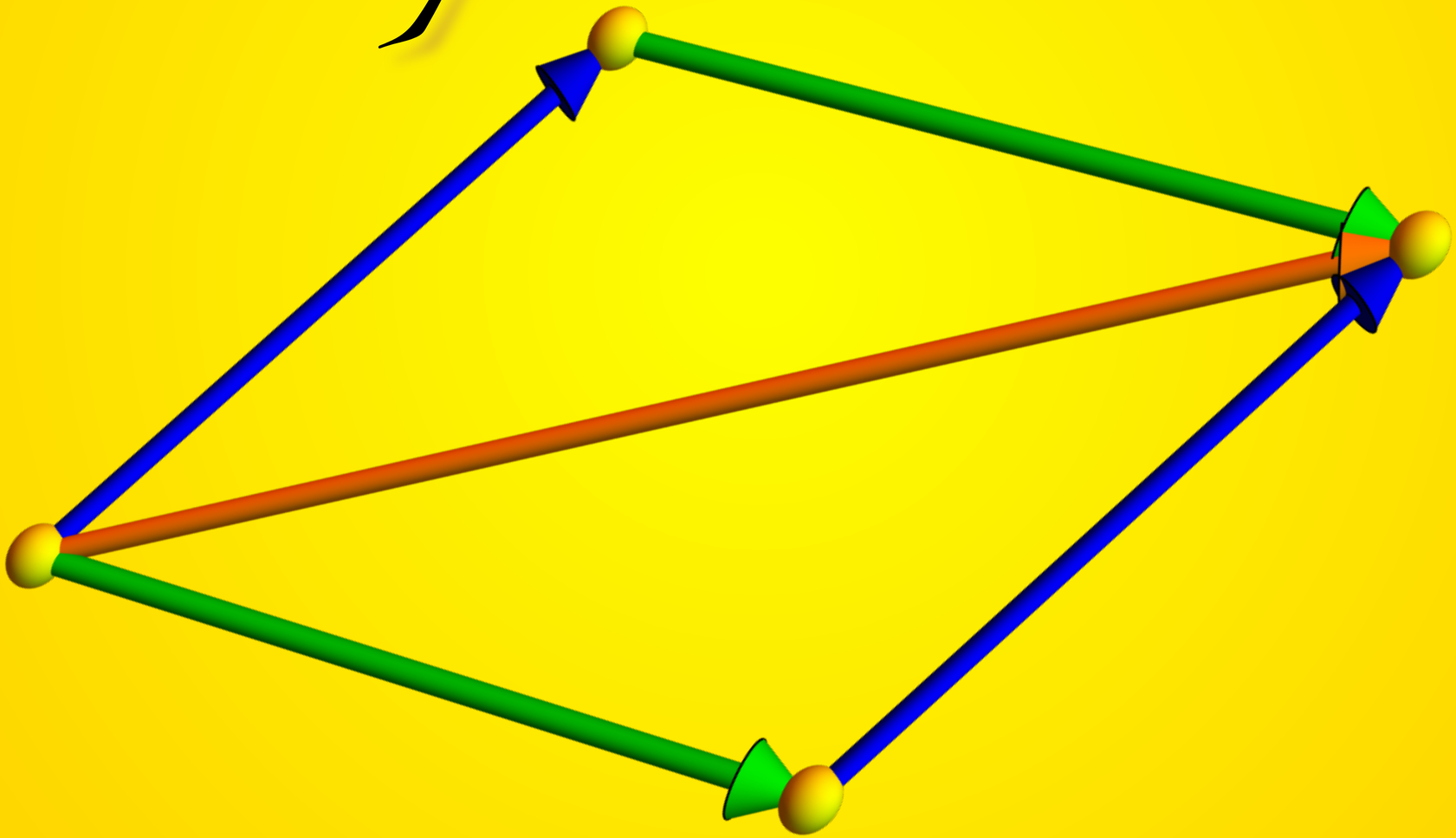
$$\vec{j} = \langle 0,1,0 \rangle$$

$$\vec{k} = \langle 0,0,1 \rangle$$

What did the vector say after making a bad joke?

i j k'ed

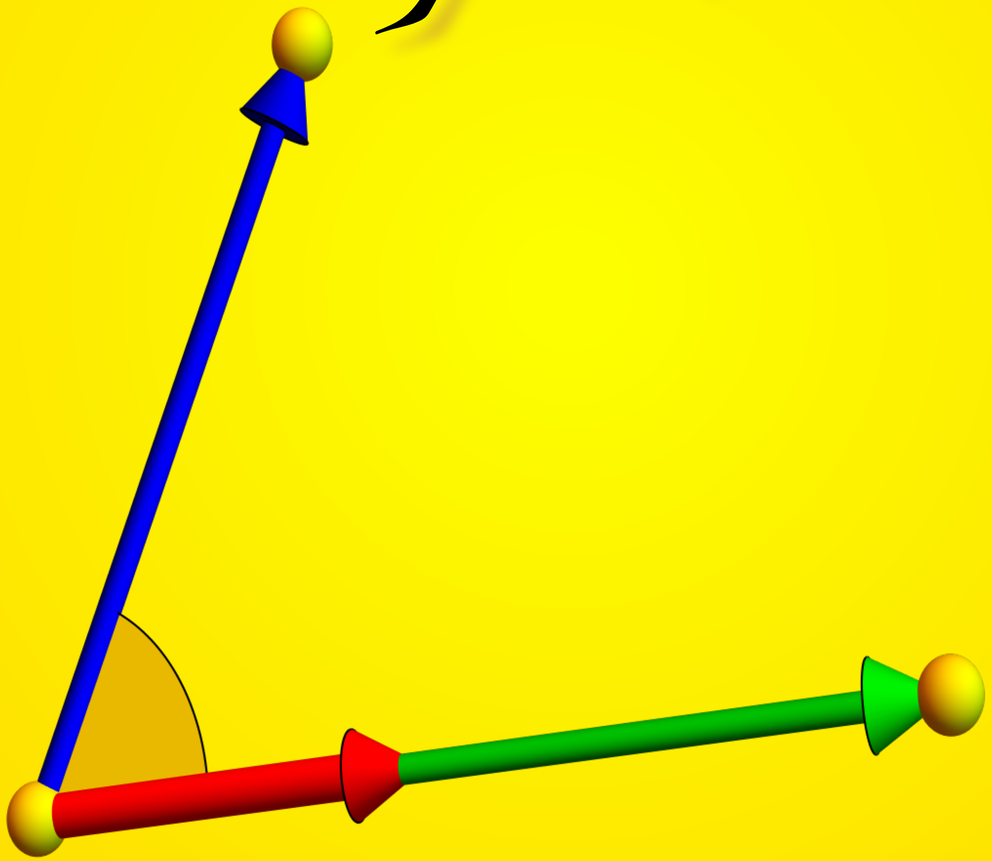
Operations



Vectors v and w are at a party. Vector v+w comes in and asks "Can I join"

v and w reply: "Yes, it is now a closed party.

Scalar projection



Cases

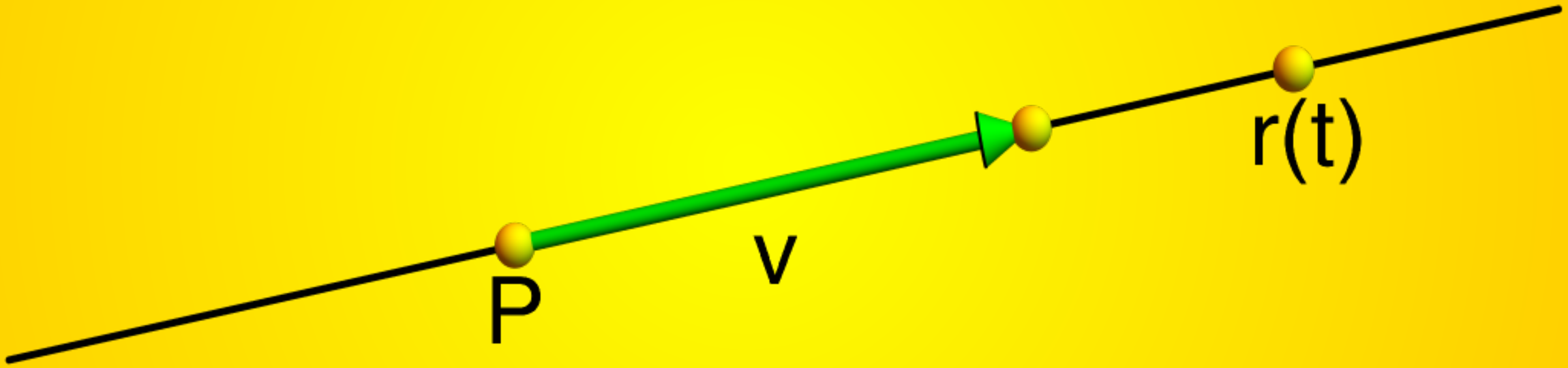
$$\text{comp}_{\vec{v}}(\vec{v}) = ||\vec{v}||$$

If v,w are perpendicular, then $\text{comp}_{\vec{w}}(\vec{v}) = 0$

$$\text{comp}_{\langle 1,0,0\rangle}(\langle a,b,c\rangle) = a$$

$$\text{comp}_{\vec{v}}(\langle 0,0,0\rangle) = 0$$

Lines

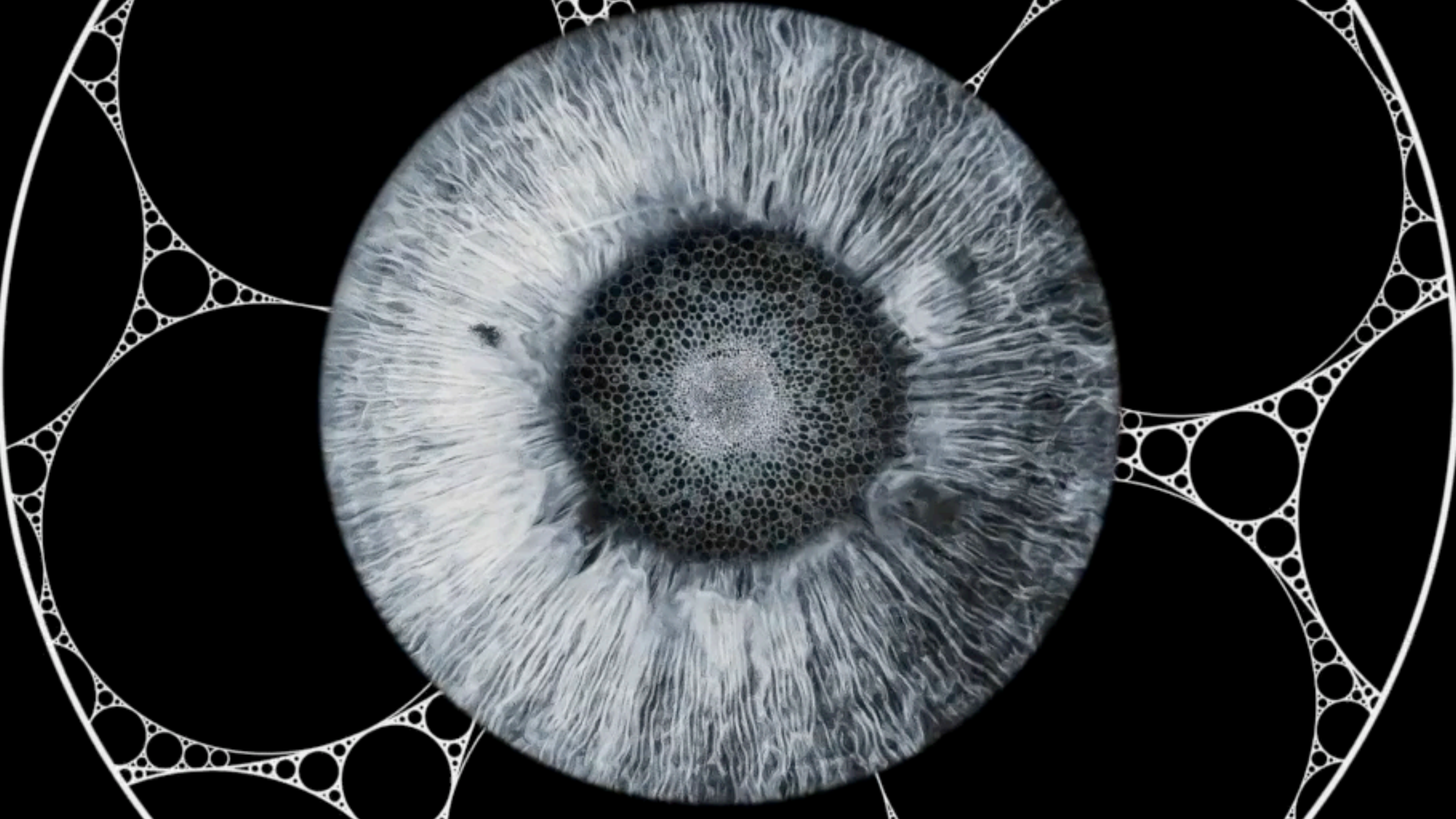


Lines

I dabbled in Cartesian coordinates, but vector geometry is where I draw the line!

Is space continuous?

I dabbled in Cartesian coordinates, but vector geometry is where I draw the line.



Homework due Friday

THE END