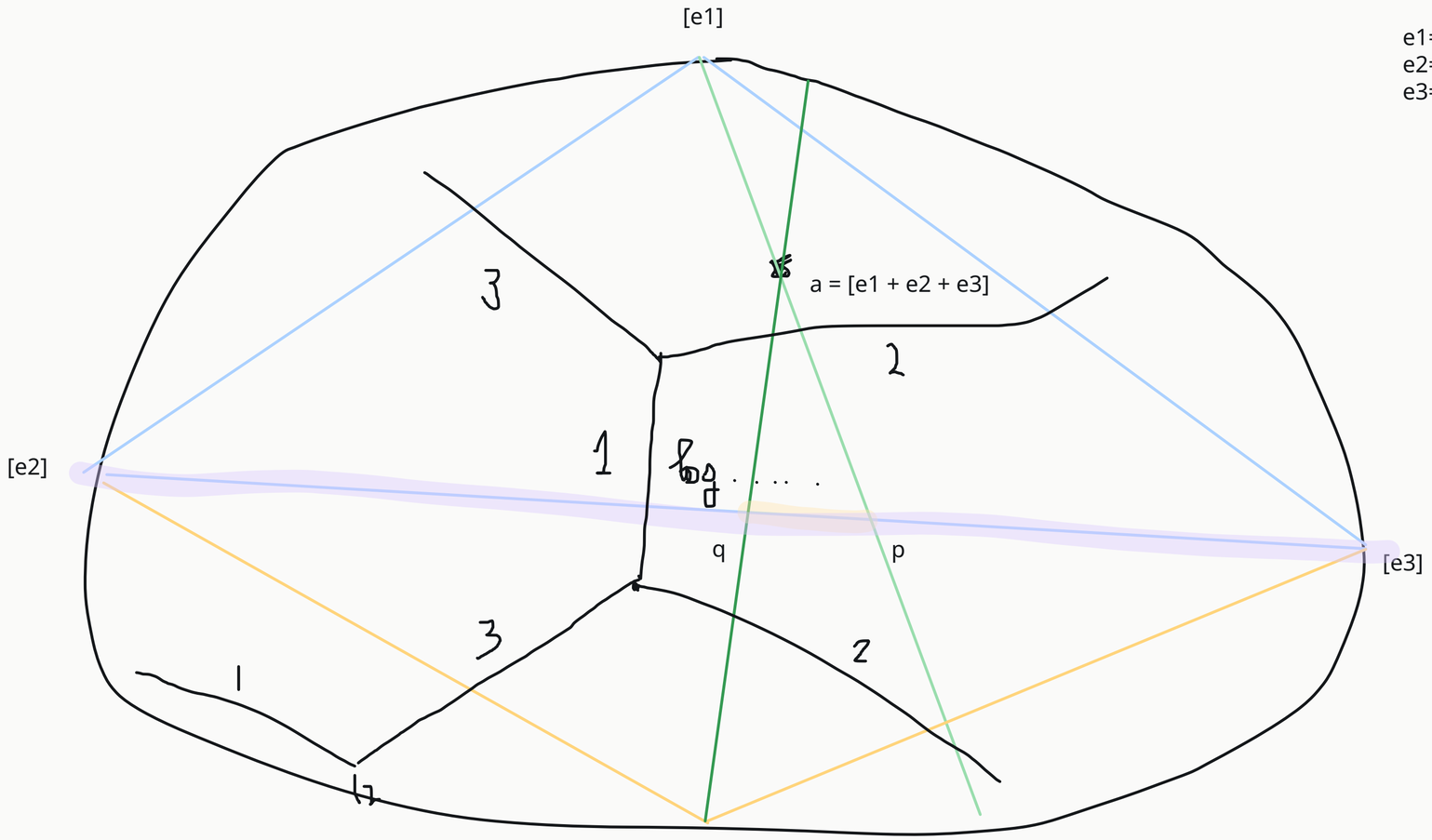


e1=[1,0,0]
e2=[0,1,0]
e3=[0,0,1]

Span{e2,e3}={x in R3: x=x2 e2+x3 e3}={x in R3: x1=0}

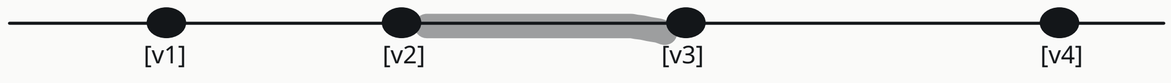
p=[0e1+p2e2+p3e3] want to find p2 and p3

p = [e2 + e3]

q = a + f1 = [(2t + 1)e2 + (2/t +1)e3]

f1=[-e1+2t e2+ 2/t e3]

Line in RP2



Since v2 is in the plane spanned by v1 and v4, v2=a1 v1+a4 v4
Since v3 is in the plane spanned by v1 and v4, v3=b1 v1+b4 v4

d([v2],[v3]) = ln (Cr[v1,v2,v3,v4])

$$Cr[v1,v2,v3,v4]=\frac{b4}{a4}\,\frac{a1}{b1}$$

Claims:

- Cr[v1,v2,v3,v4]>1
- It doesn’t depend on the choice of coordinates. In other words, if I rescale v1, v2, v3, v4 INDEPENDENTLY, the cross ratio does not change
- For any invertible 3x3 matrix A, we have Cr[Av1,Av2,Av3,Av4]=Cr[v1,v2,v3,v3]