

> restart:

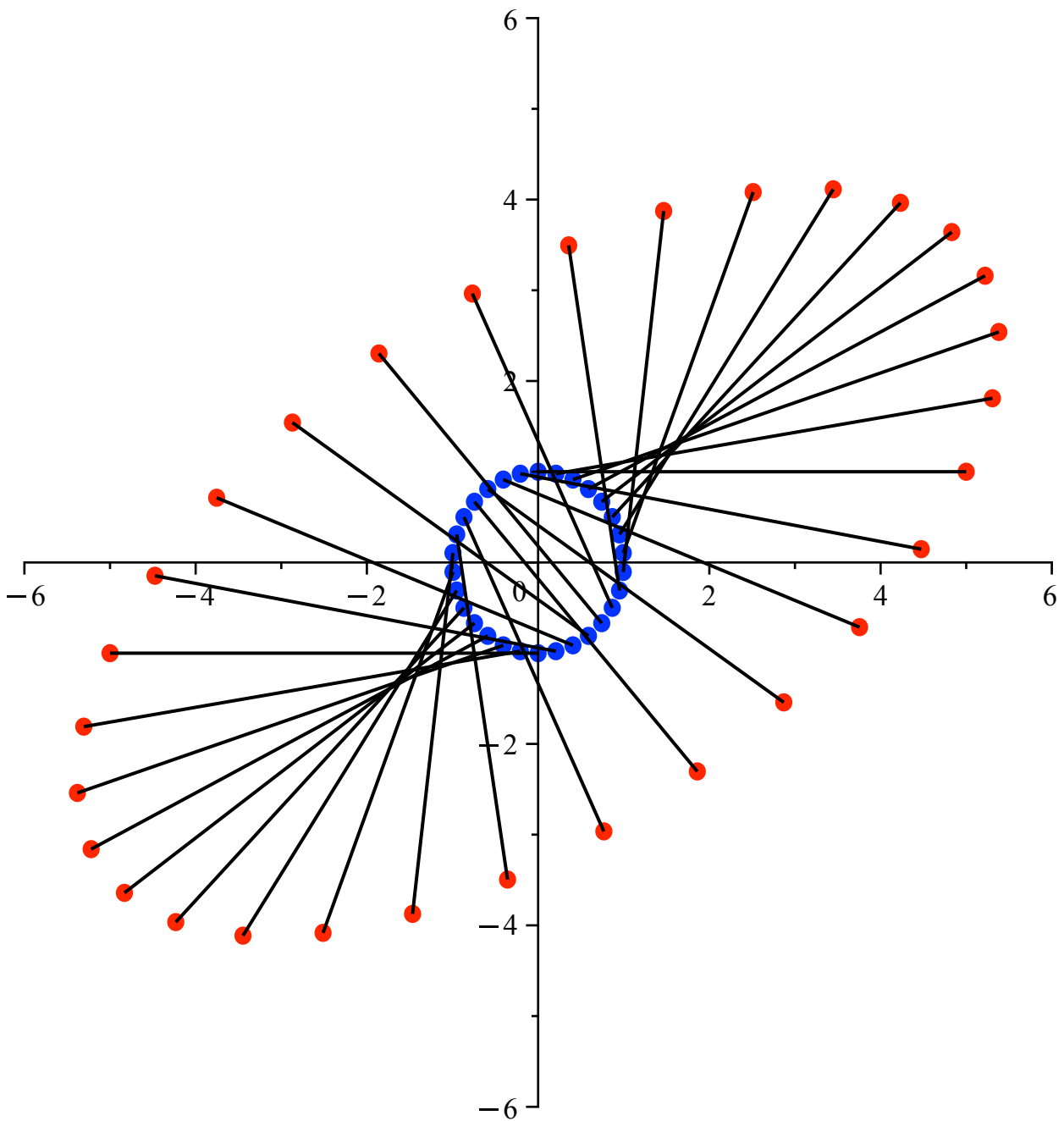
> with(plots):with(plottools):
with(LinearAlgebra):

2d

```
> A:=Matrix([[2,5],[4,1]]);  
A3:=Matrix([[2,5,0],[4,1,0], [0,0,1]]);  
#A:=Matrix([[4,2],[2,1]]);  
#A3:=Matrix([[4,2,0],[2,1,0], [0,0,1]]);
```

$$A := \begin{bmatrix} 2 & 5 \\ 4 & 1 \end{bmatrix}$$
$$A3 := \begin{bmatrix} 2 & 5 & 0 \\ 4 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (1.1)$$

```
> N:=30:point2:=[:line2:=[:  
  for k from 0 to N-1 do  
    x0:=Vector([sin(2*Pi*k/N),cos(2*Pi*k/N)]);  
    x1:=A.x0;  
    p0:=convert(x0,list);  
    p1:=convert(x1,list);  
    point2:= [op(point2),disk(p0,0.1,color=blue, style=patchnogrid)];  
    point2:= [op(point2),disk(p1,0.1,color=red, style=patchnogrid)];  
    line2:= [op(line2),line(p0,p1)];  
  end do:  
> d:=6: display(point2,line2,view=[-d..d,-d..d]);
```



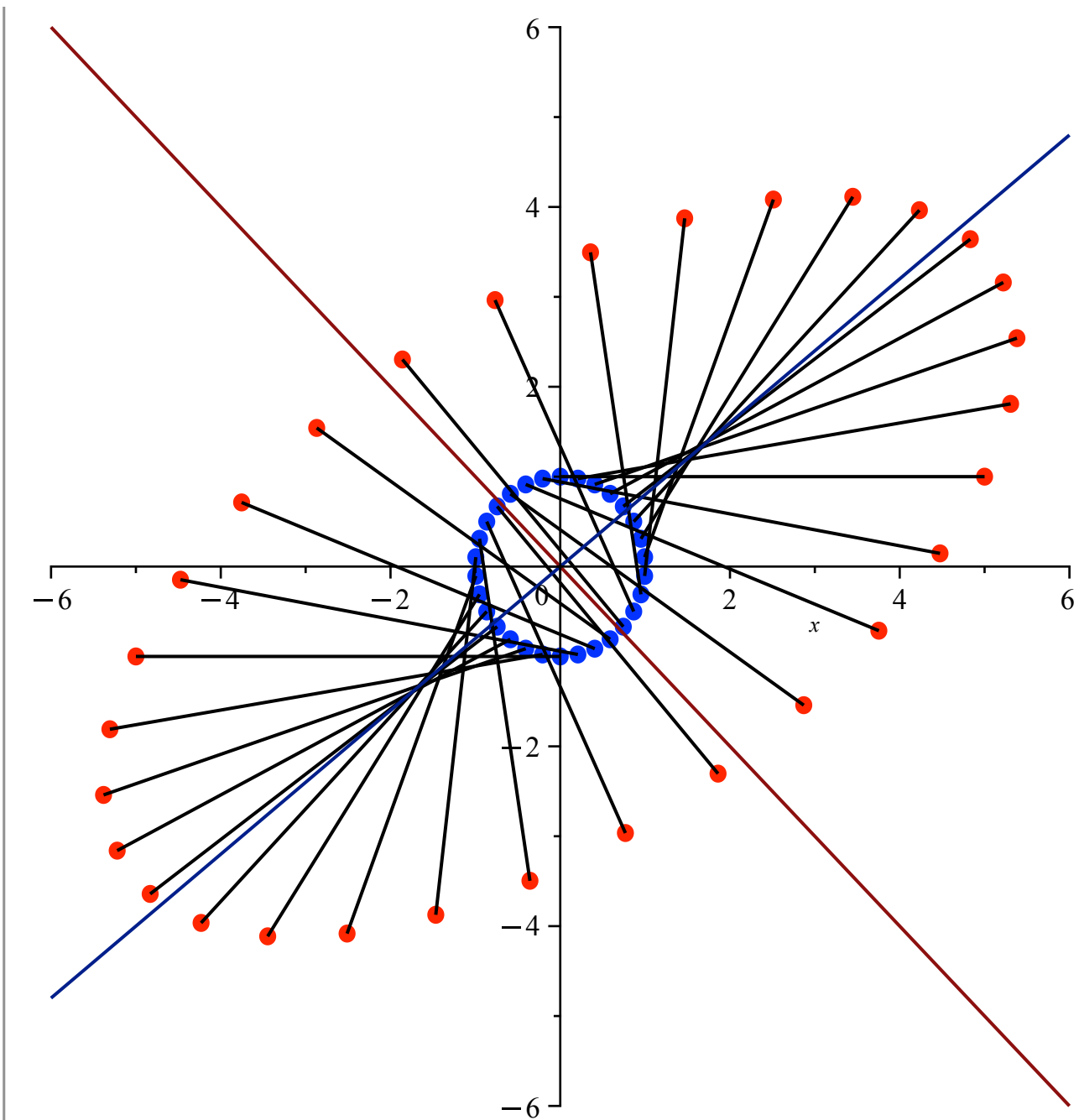
2d with Eigenvectors

> `lambda,P:=Eigenvectors(A);`

$$\lambda, P := \begin{bmatrix} 6 \\ -3 \end{bmatrix}, \begin{bmatrix} \frac{5}{4} & -1 \\ 1 & 1 \end{bmatrix} \quad (2.1)$$

> `vv1:=Column(P,1): vv2:=Column(P,2):`
`a1:=vv1[2]/vv1[1]: a2:=vv2[2]/vv2[1]:`
`pp1:=plot({a2*x,a1*x},x=-d..d):`

> `display(point2,line2,pp1,view=[-d..d,-d..d]);`



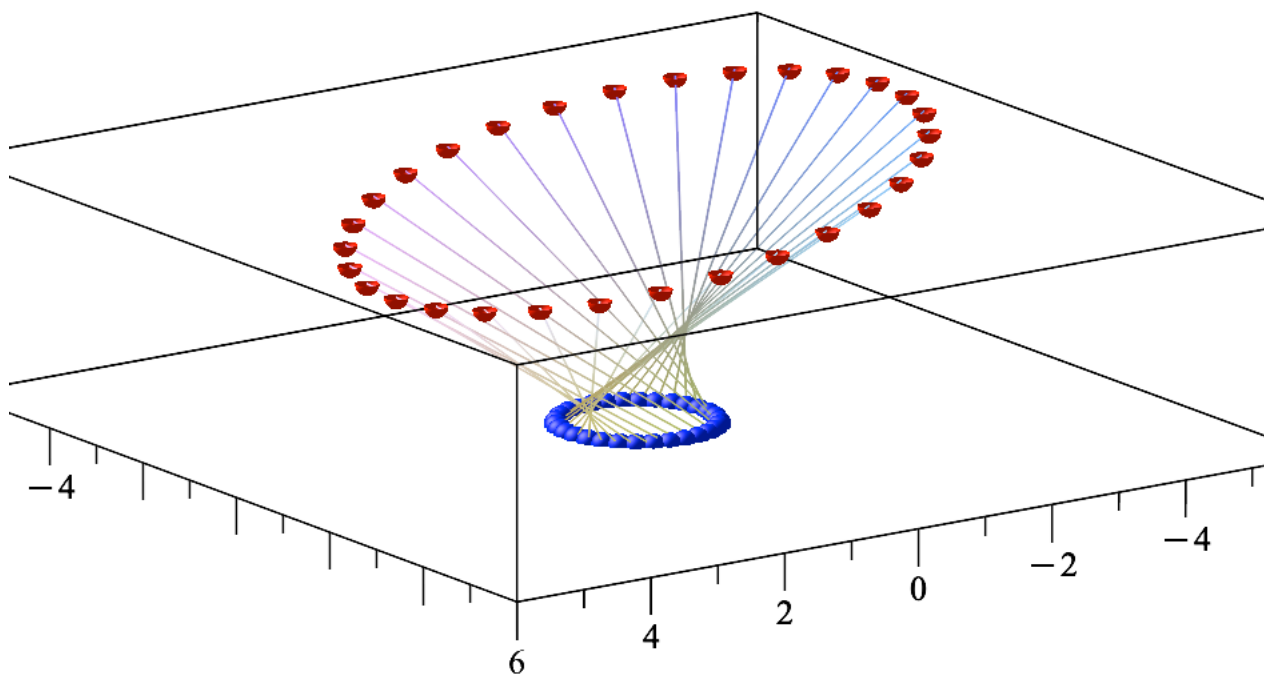
3d

```

> N:=30:point2:=[:line2:=[:
  for k from 0 to N-1 do
    x0:=Vector([sin(2*Pi*k/N),cos(2*Pi*k/N),0]);
    x1:=A3.x0+Vector([0,0,3]);
    p0:=convert(x0,list);
    p1:=convert(x1,list);
    point2:=[op(point2),sphere(p0,0.15,color=blue, style=patchnogrid)];
    point2:=[op(point2),sphere(p1,0.15,color=red, style=patchnogrid)];
    line2:=[op(line2),line(p0,p1)];
  end do:
> d:=6: display(point2,line2,view=[-d..d, -d..d, 0..3], scaling=

```

constrained);



```
> d:=6: display(point2,line2,view=[-d..d, -d..d, 0..3], scaling=constrained,  
axes=box);
```

