Math 22 Fall 2004

Linear Algebra with Applications

Eigenspaces of a Linear Transformation

November 15, 2004

Load the packages for doing Linear Algebra

```
> with(Student[LinearAlgebra]):
Warning, the protected name `.` has been redefined and unprotected
```

Define a matrix that describes a linear trasformation to work with

```
> A := <<1,1/3>|<1/2,-1/2>>;
```

$$A := \begin{bmatrix} 1 & \frac{1}{2} \\ \frac{1}{3} & \frac{-1}{2} \end{bmatrix}$$

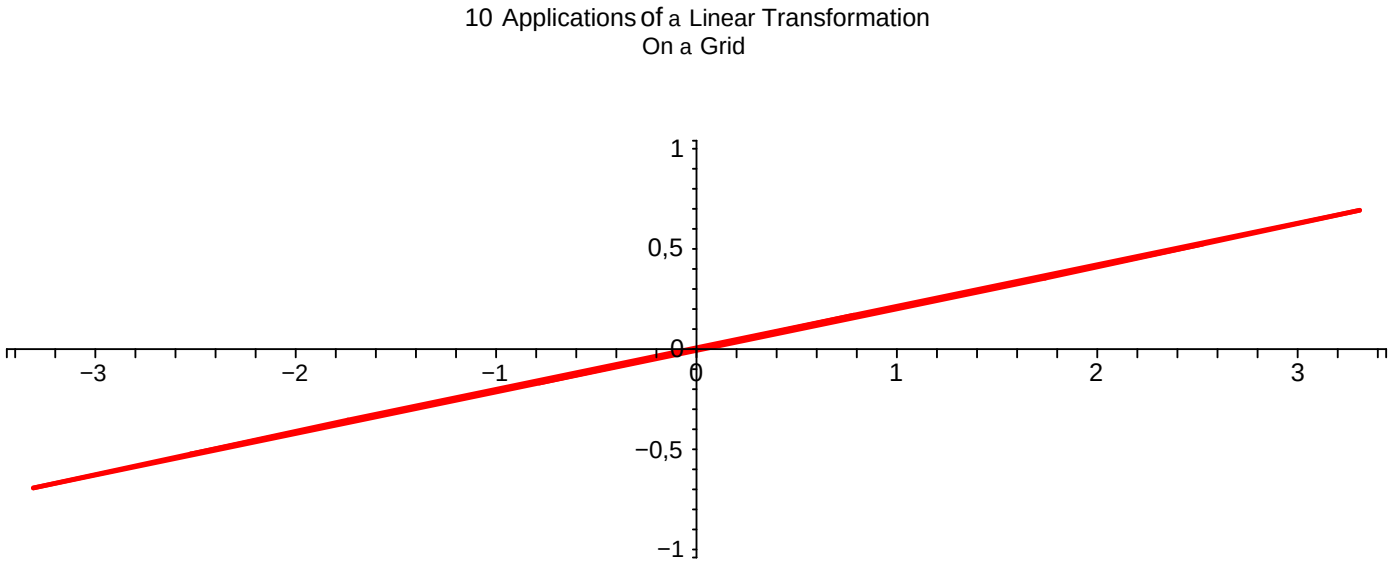
Find the eigenvalues

```
> Eigenvalues(A), evalf(Eigenvalues(A));
```

$$\begin{bmatrix} \frac{1}{4} + \frac{1}{12}\sqrt{105} \\ \frac{1}{4} - \frac{1}{12}\sqrt{105} \end{bmatrix}, \begin{bmatrix} 1.103912564 \\ -0.6039125641 \end{bmatrix}$$

Apply the transformation to a grid multiple times to see the eigenspace corresponding to the largest eigenvalue.

```
> ApplyLinearTransformPlot( A, grid, iterations = 10, output = animation,
scaling=constrained, thickness = 2 );
```




```
>
```