

# Matlab Tutorial: Eigenstuff

## Time

We estimate this tutorial will take 10 minutes. That includes time for a bit of playing around with the commands.

## Finding eigenstuff: the eig function

*% Given a square matrix the eig function returns eigenstuff.*

*% Our favorite 2 x 2 matrix*

```
> A = [6 5; 1 2]
```

```
A =  
     6     5  
     1     2
```

*% The eig function returns the eigenvalues:*

```
> eig(A)
```

```
ans =  
     7  
     1
```

*% To get the eigenvectors and eigenvalues use the following syntax:*

```
> [S,D] = eig(A)
```

```
S =  
  0.98058 -0.70711  
  0.19612  0.70711
```

```
D =  
     7     0  
     0     1
```

*% Matlab put the eigenvectors as the columns of S and the eigenvalues in the diagonal matrix D. Notice that S is not guaranteed to have nice (to humans) columns like [5 1]' or [1 -1]'*

*% You can check the diagonalization formula:*

```
> S*D*S^(-1)
```

```
ans =  
     6     5  
     1     2
```

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