Stellar Motion - Part 2

Calculate all the stars' speed at once

This code loads the data from the previous project.

```
load starData
```

Task 1

```
spectra
spectra = 357×7
10⁻¹² ×
    0.3088    0.1340    0.0598    0.0892    0.1088    0.1625    0.0392
    0.3136    0.1338    0.0607    0.0898    0.1084    0.1630    0.0382
    0.3105    0.1347    0.0618    0.0915    0.1104    0.1615    0.0371
    0.3076    0.1357    0.0625    0.0931    0.1124    0.1586    0.0378
    0.3088    0.1354    0.0627    0.0936    0.1122    0.1574    0.0391
    0.3105    0.1343    0.0622    0.0932    0.1136    0.1589    0.0396
    0.3122    0.1335    0.0619    0.0929    0.1138    0.1611    0.0402
    0.3101    0.1325    0.0620    0.0925    0.1130    0.1607    0.0399
    0.3078    0.1335    0.0626    0.0924    0.1124    0.1593    0.0387
    0.3047    0.1329    0.0625    0.0918    0.1108    0.1582    0.0379
```

```
[sHa,idx] = min(spectra);
lambdaHa = lambda(idx);
z = lambdaHa/656.28 − 1;
speed = z*299792.458
speed = 7×1
   −36.5445
  −100.4973
   −36.5445
    27.4083
    27.4083
   155.3139
  −228.4029
```

Tasks 2 - 4

create a plot containing all seven stars. You'll use different styles for redshifted and blueshifted spectra. Since the `plot` command won't be the same for every star, it's convenient to use a `for` loop.

```
for v = (1:7)
    s=spectra(:,v)
    if speed(v)<=0
        loglog(lambda,s,"−−")

    else
        loglog(lambda,s,"LineWidth",3)

    end
    hold on
end
```

s = 357×1

10^{-12} ×

    0.3088
    0.3136
    0.3105
    0.3076
    0.3088
    0.3105
    0.3122
    0.3101
    0.3078
    0.3047

s = 357×1

10^{-12} ×

    0.1340
    0.1338
    0.1347
    0.1357
    0.1354
    0.1343
    0.1335
    0.1325
    0.1335
    0.1329

s = 357×1

10^{-13} ×

    0.5981
    0.6074
    0.6176
    0.6252
    0.6271
    0.6221
    0.6192
    0.6200
    0.6261
    0.6249

s = 357×1

10^{-13} ×

    0.8919
    0.8981
    0.9152
    0.9311
    0.9355
    0.9321
    0.9286
    0.9247
    0.9240
    0.9177

s = 357×1

10^{-12} ×

    0.1088
    0.1084
    0.1104
    0.1124
    0.1122
    0.1136
    0.1138
    0.1130
    0.1124
    0.1108

s = 357×1

```
10⁻¹² ×

    0.1625
    0.1630
    0.1615
    0.1586
    0.1574
    0.1589
    0.1611
    0.1607
    0.1593
    0.1582
s = 357×1
10⁻¹³ ×

    0.3918
    0.3821
    0.3712
    0.3776
    0.3910
    0.3955
    0.4023
    0.3986
    0.3874
    0.3793
hold off
```

Task 5

Add a legend to the plot using the array `starnames`.

```
legend(starnames)
```

Task 6

identify the stars with redshifted spectra

```
movaway=starnames(speed>0)
```

```
movaway = 3×1 string
"HD   5211"
"HD  56030"
"HD  94028"
```