In[26]:= b = 2
d = 1

Out[26]= 2

Out[27]= 1

In[12]:= // Slide this to change g parameter

In[107]:= Clear[g]

In[91]:= g = 1

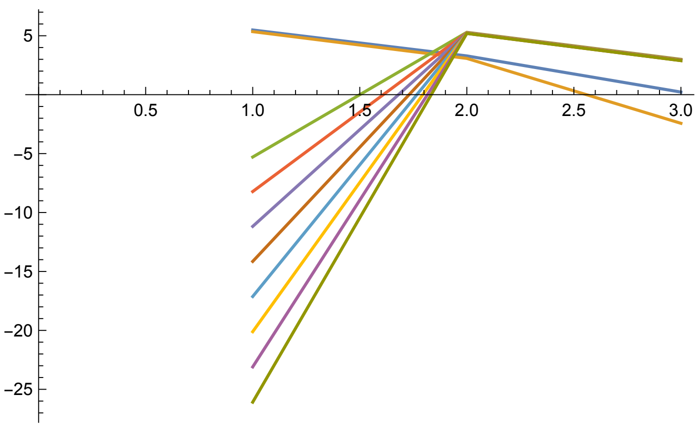
Out[91]= 1

In[69]:= N[Eigenvalues[{{2 * d - g, -g, -g}, {-g, 4 * d - g, -g}, {-g, -g, 6 * d - g}}]]

Out[69]= {5.48929, 3.28917, 0.221543}

In[142]:= ListLinePlot[Table[
Eigenvalues[{{2 * d - g, -g, -g}, {-g, 4 * d - g, -g}, {-g, -g, 6 * d - g}}], {g, 10}]]

Out[142]=



A bit confusing of a graph. Unfortunately it was the only way I could figure to plot the eigenvalues as a function of the interaction term g. The eigen values themselves are on the x axis. Eigenvalue one is at x = 1, eigen value 2 is at x = 2, and so on. We see as g is increased to 10 eigen value 1 increases negatively. While eigenvalues 2 and 3 converge to the same number. Below I give the eigen vectors and values for g = 10 b = 2, d = 1.

Clear[g]

In[145]:= g = 10

Out[145]= 10

In[146]:= N[Eigenvalues[{{2 * d - g, -g, -g}, {-g, 4 * d - g, -g}, {-g, -g, 6 * d - g}}]] // MatrixForm

Out[146]//MatrixForm=

$$\begin{pmatrix} -26.0888 \\ 5.19823 \\ 2.89053 \end{pmatrix}$$

In[149]:=
```
N[Eigenvectors[{{2 * d - g, -g, -g}, {-g, 4 * d - g, -g}, {-g, -g, 6 * d - g}}]] //
  MatrixForm
```

Out[149]//MatrixForm=

$$\begin{pmatrix} 1.14241 & 1.06647 & 1. \\ -0.250692 & -0.669131 & 1. \\ -3.49171 & 2.80266 & 1. \end{pmatrix}$$