In [2]:

```
from IPython.display import Image
```

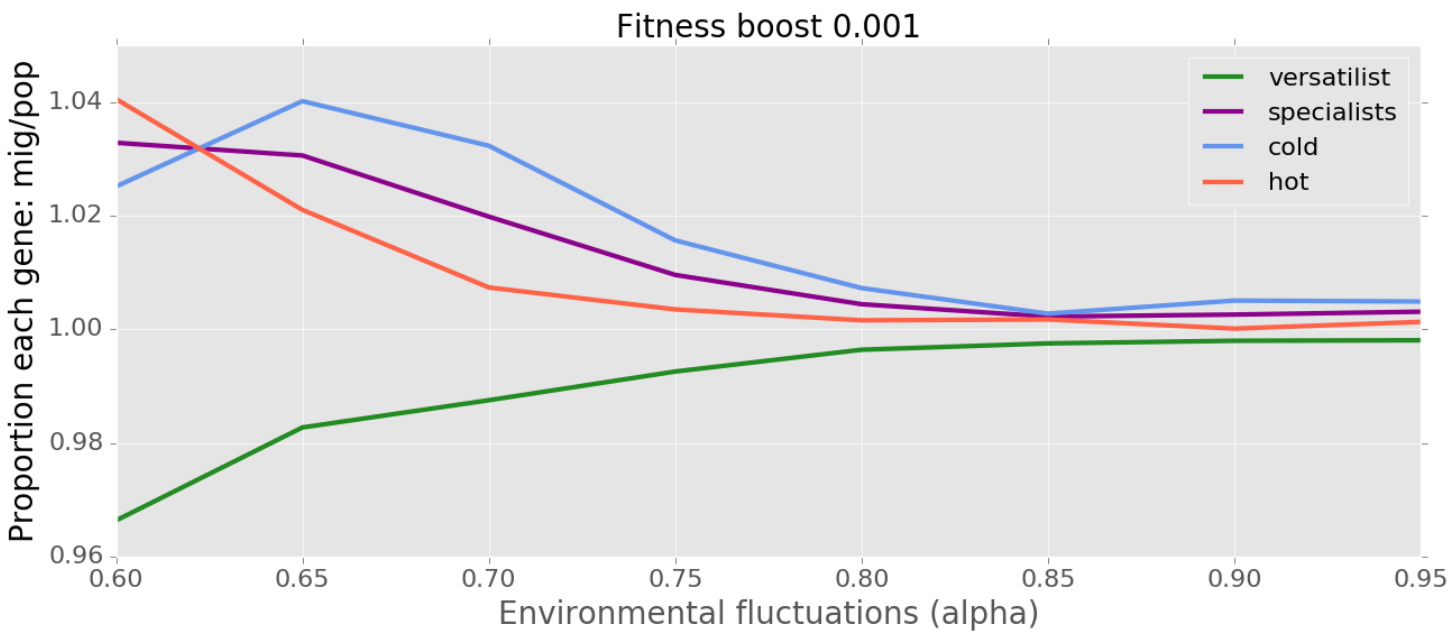
Which types are over- and underrespresented in the migration wave

This is a plot of for each type: frequency_migrants / frequency_population. So values higher than 1 indicate that they type of gene is overrepresented in the dispersal wave. When averaged over the full period of one run, the specialists migrate more.

In [5]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/WhosDispersing1_diff_MigByPop_All.png')
```

Out[5]:

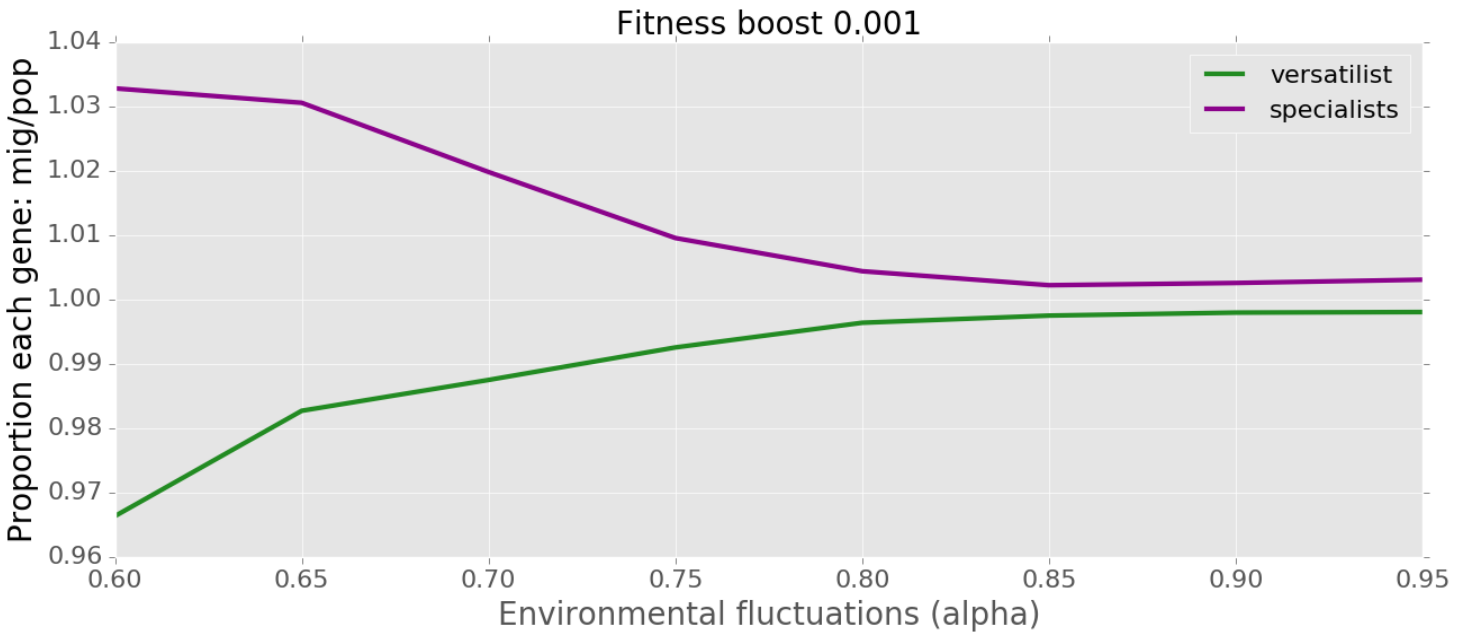


Or just summarised (specialists grouped together). The x-axis is the amplitude of the environmental fluctuations. Higer values (like 0.95) indicate LOWER amplitude (that's why the runs take longer). However, the high amplitude runs (alpha = 0.60, 0.65) are also much shorter and there are less runs that fixated so it's less robust.

In [6]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/WhosDispersing1_diff_MigByPop.png')
```

Out[6]:



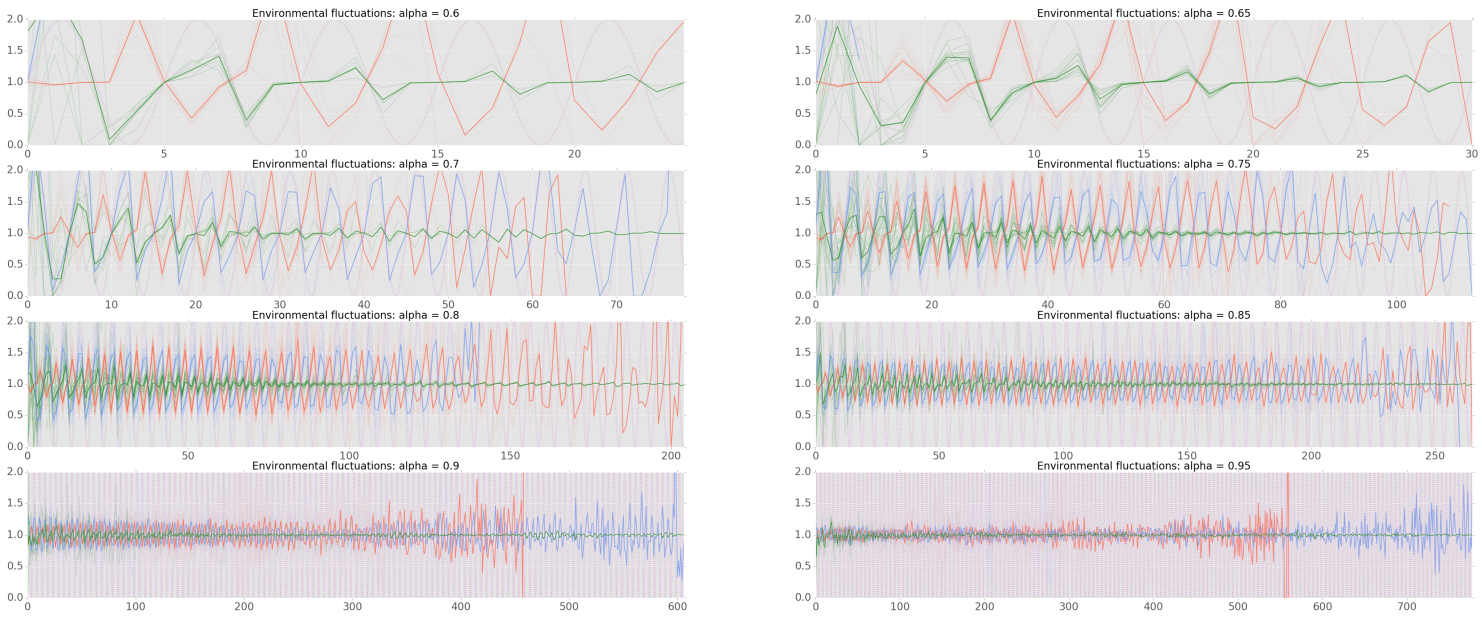
Now let's look at the same thing but over the period of the run.

First, which type of genes is over- and under- represented changes with the environmental fluctuations.

In [4]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/diff_migr_allQuarter_k5_sine.png')
```

Out[4]:

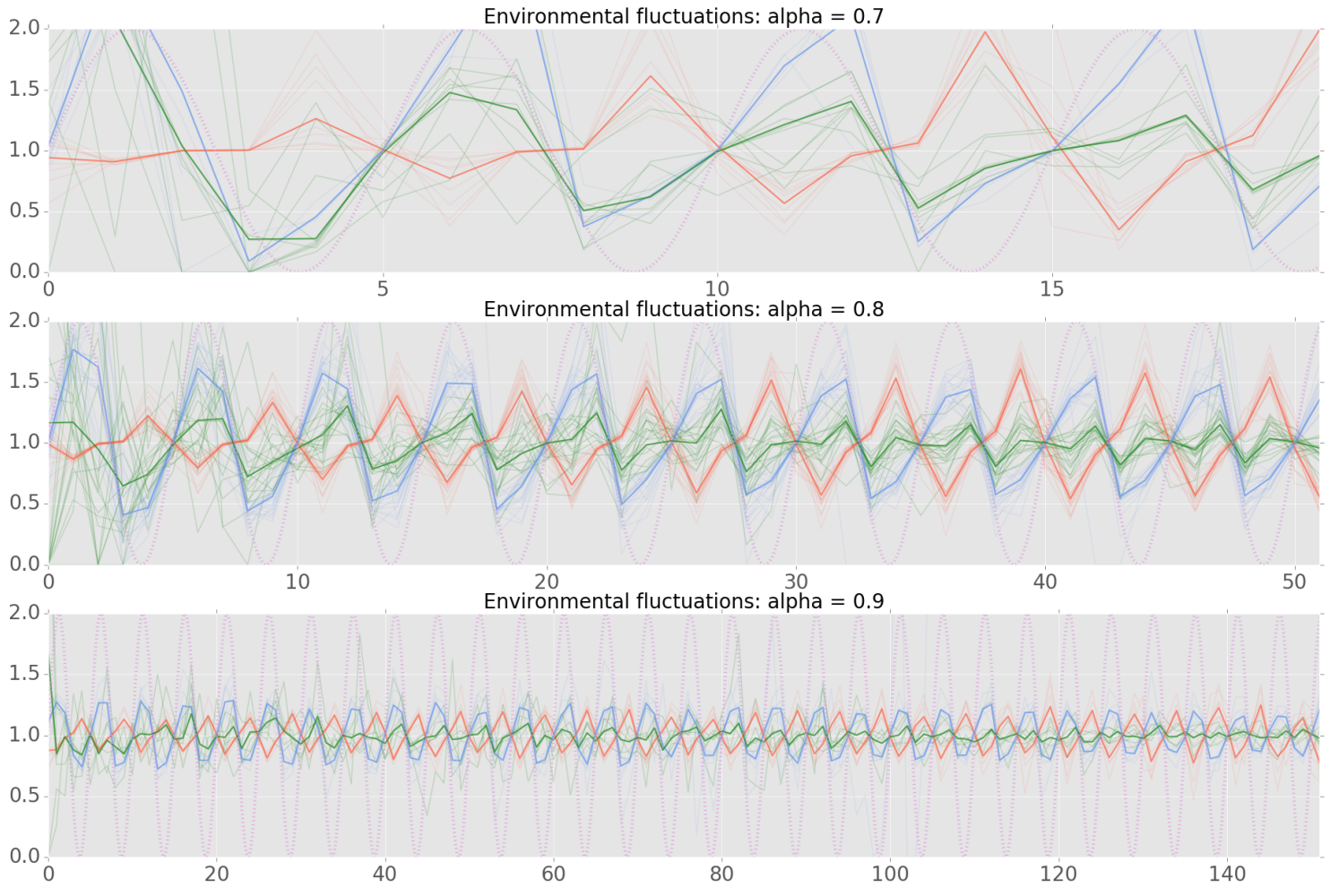


Now, let's zoom in properly. These figures show ONLY the first 25% of the simulation. Plus I also added a sine curve (in purple) to visualise where exactly things happen.

In [8]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/diff_migr_firstQuarter_k5_sine_cropped.png')
```

Out[8]:



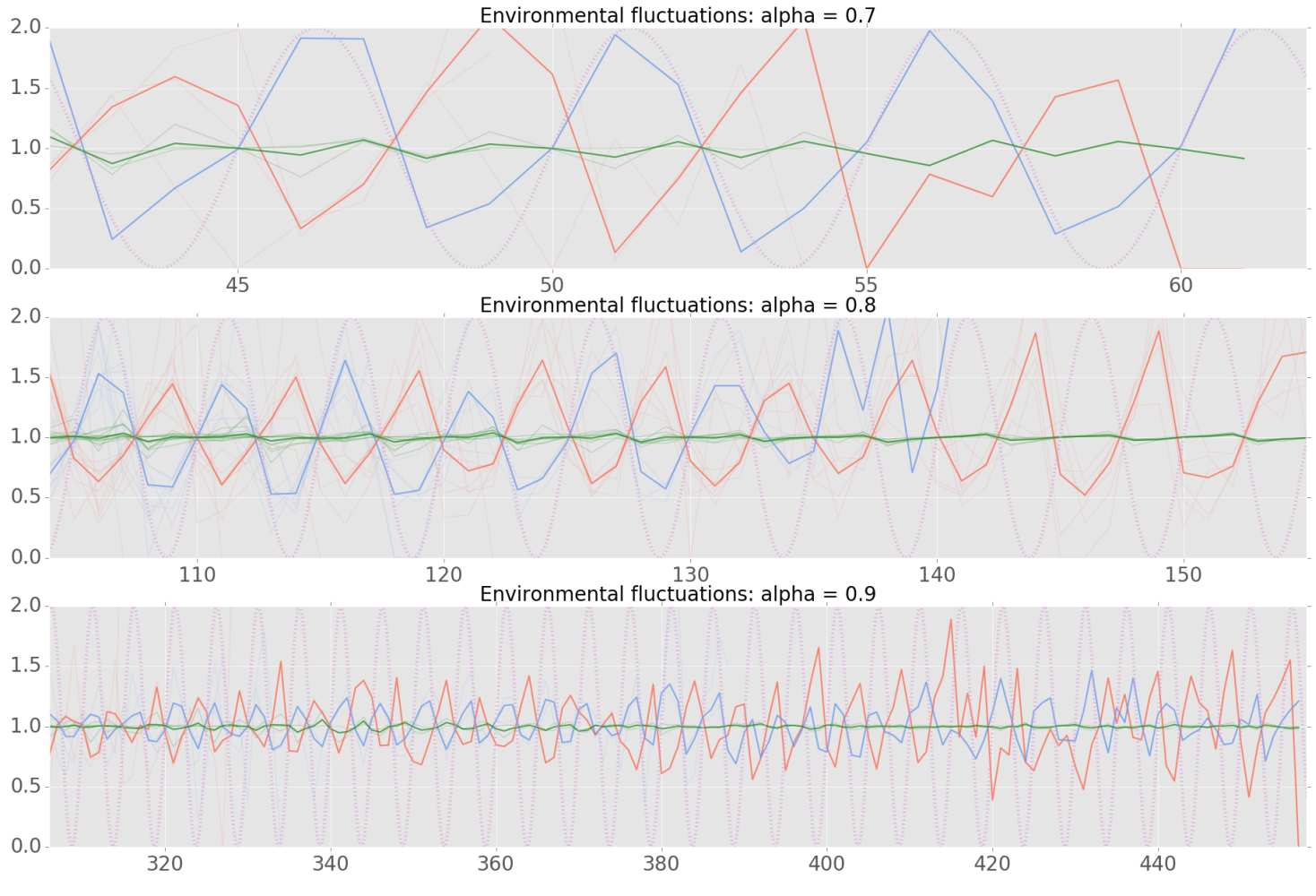
So it looks like the versatilist gene goes overrepresented at the end of an environmental fluctuation and then drops drammatically at the beginning of the next environmental change. The specialist have simular pattern but much less pronounced.

All of this changes further down the road when versatilists become established in the population. These graphs show the 3rd quarter of the runs (from 50%-75% of the total time - the last 25% is not that helpful because there're 2-3 outlier runs where one of the specialists does not die for a long time).

In [10]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/diff_migr_3rdQuarter_k5_sine_cropped.png')
```

Out[10]:



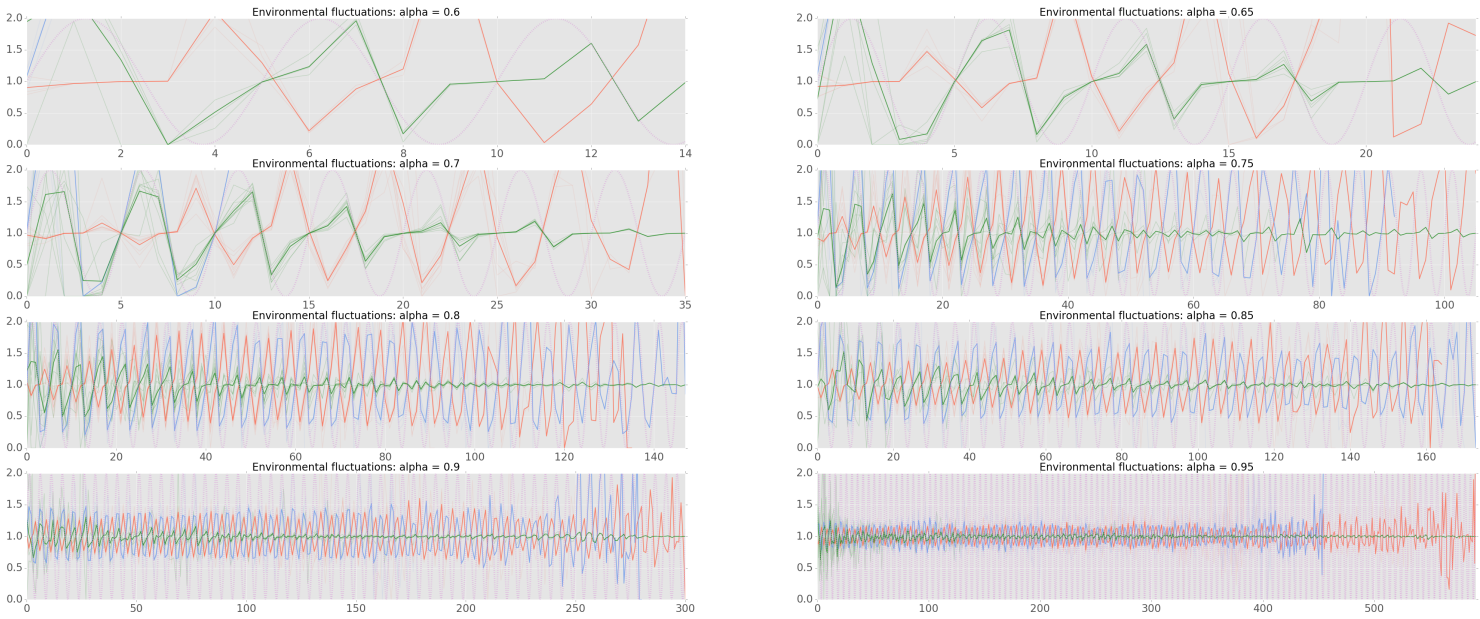
It looks like the versatilist gene becomes very stable so the population pumps a steady proportion into the dispersal wave. This is also the case for low emplitude of the environmental fluctuations - you can see that for settings with alpha 0.90 (low fluctuations) the graph is generally flatter than for 0.70 (higher fluctuations).

I have also checked what happens when the log curve we use to determine the probability of migration is steeper (k = 10 instead of k =5). Not much happens in fact; everything is a bit more extreme. I guess everyone is affected in a similar fashion.

In [12]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/diff_migr_allQuarter_k10_sine.png')
```

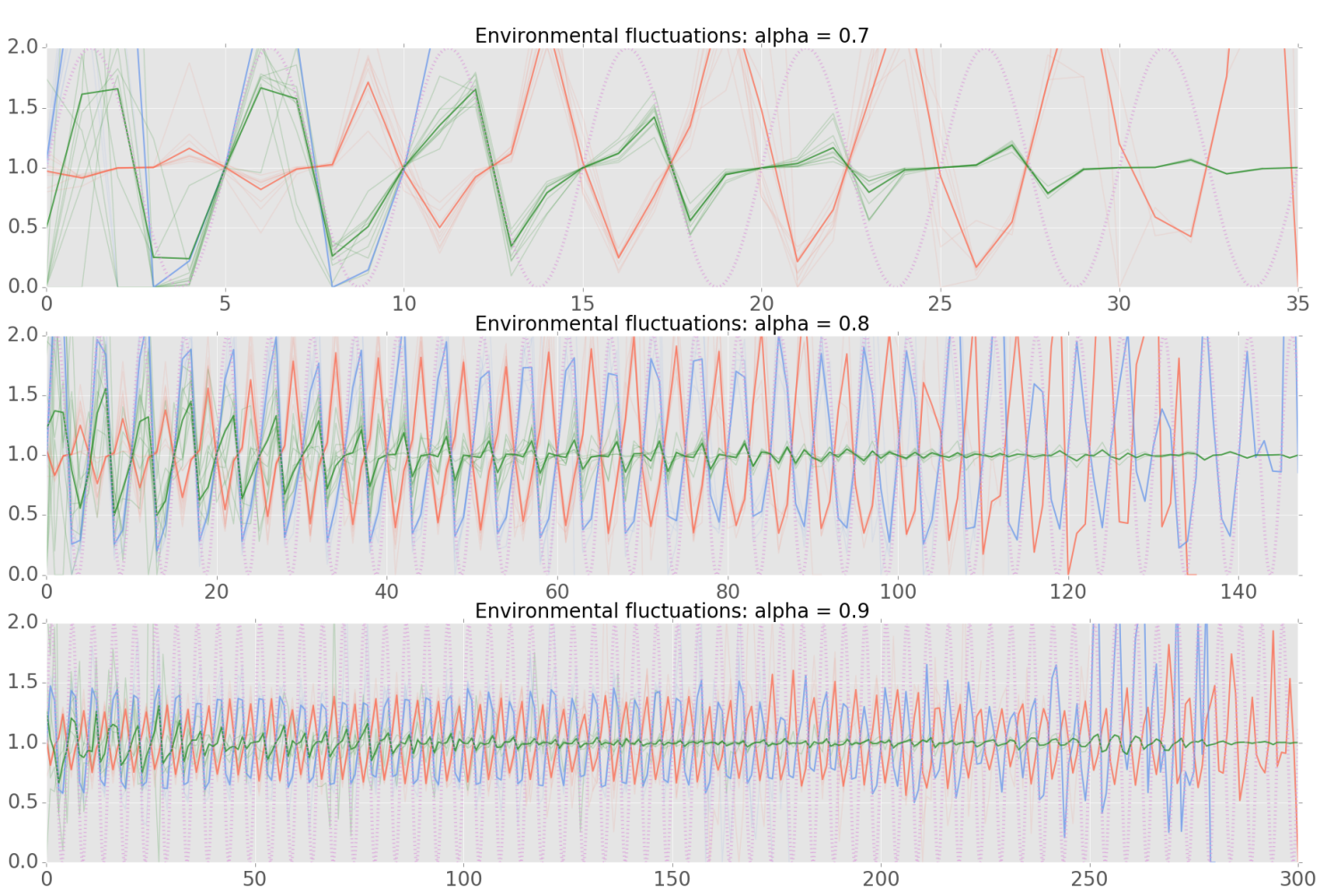
Out[12]:



In [13]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/diff_migr_allQuarter_k10_sine_cropped.png')
```

Out[13]:



In general it makes very little difference to the overal results.

In [3]:

```
Image(filename='/Users/iar1g09/Dropbox/IZA/PHD/case_studies/variability_case_study/figures_final/WhosDispersing1_diff_MigByPop_k10.png')
```

Out[3]: