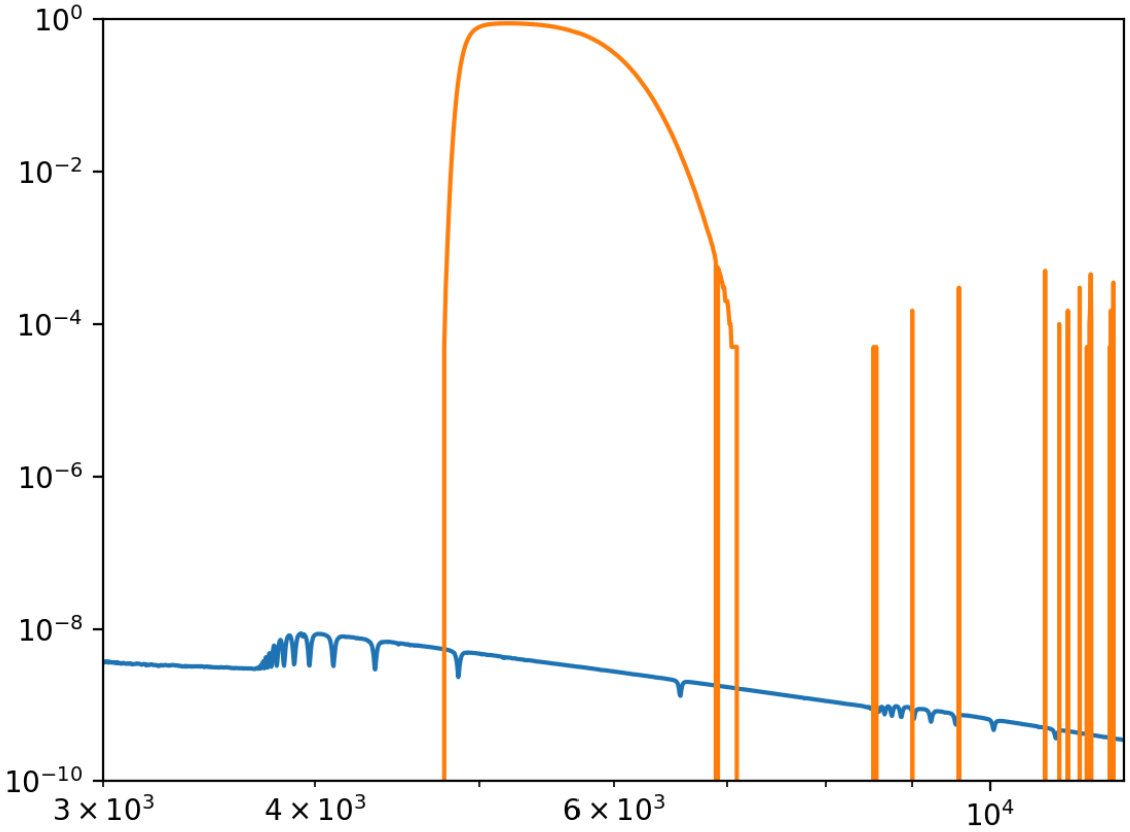
The plot for task 1 is visible if you run the code. However, here it is:



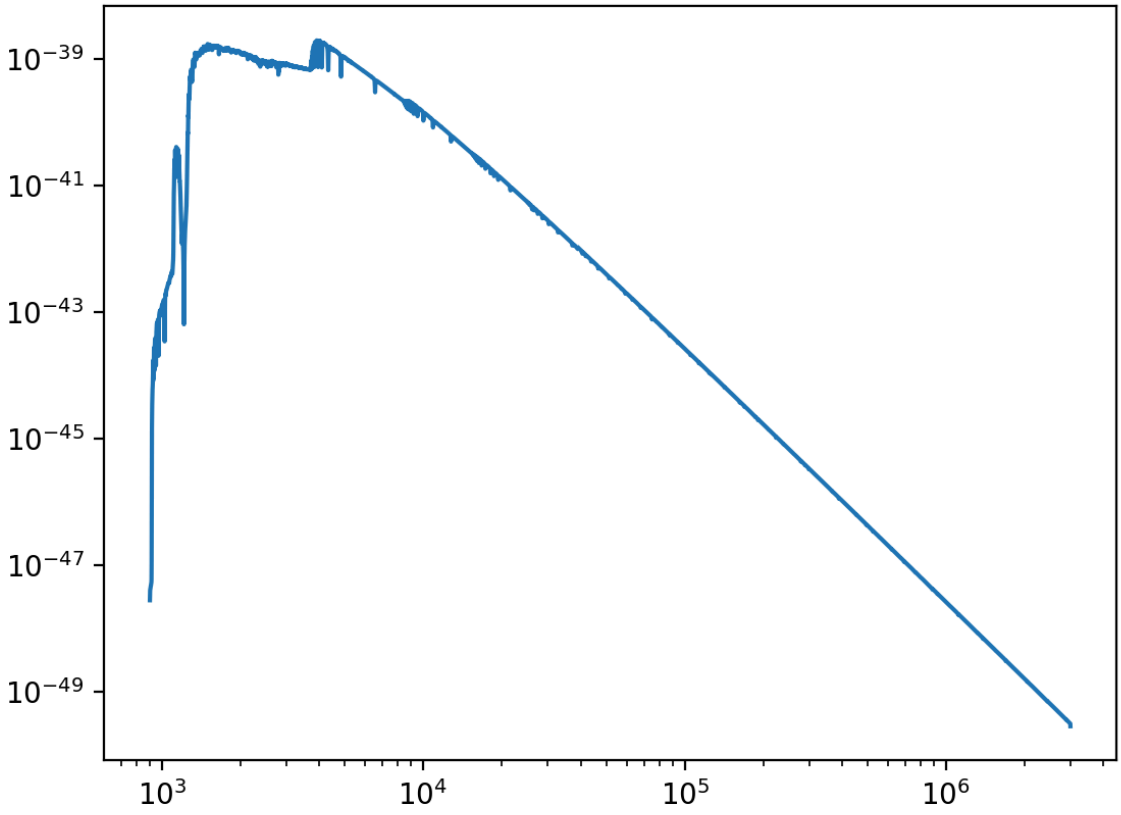
Only plotted within the bounds of the filter– x axis is wavelength and y axis is SED for Vega for the blue line or filter for the orange line. I'm not sure what those odd spikes are about, but they were included in the filter file I used. They're thin, so they don't affect the results.

Similarly, my results for task 1 are as follows:
Flux: 3.3066888829195705e-06
Photon count: 902001.9756320835

For task 2, my results are
Flux: 5.887545519127283e-06
Photon count: 1385447.7440377236

For the final task, I get a scale factor of
6.309573444801943e-12.

For scale factors for other magnitudes, Vega's SED is not constant, so the magnitude would differ based on wavelength. Thus, the scale factor would also differ. You'd need to loop over the wavelength and not apply one specific factor for all of them. (However, if the magnitude difference is static, it would be just one factor). I apply this code in task3.py– the plot is visible below.


10^{-39}
10^{-41}
10^{-43}
10^{-45}
10^{-47}
10^{-49}
10^{3}
10^{4}
10^{5}
10^{6}