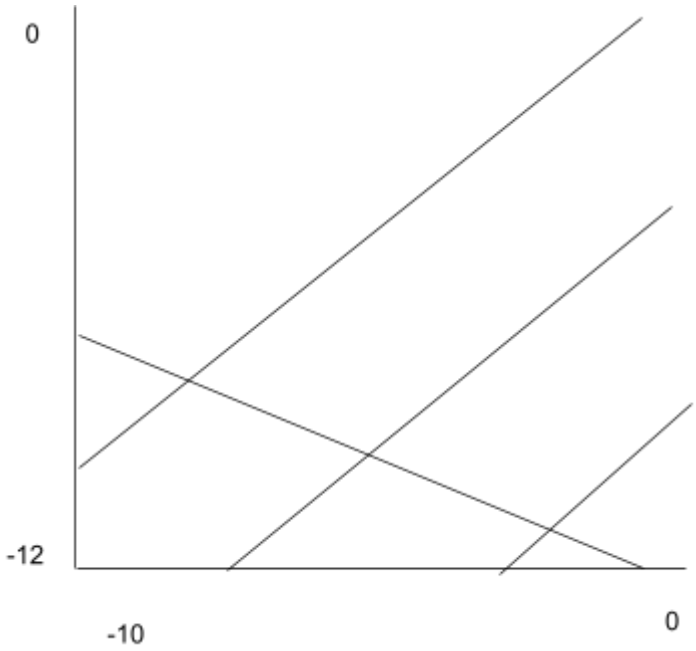
Grade: check+

Numerical Derivatives and Richardson Extrapolation



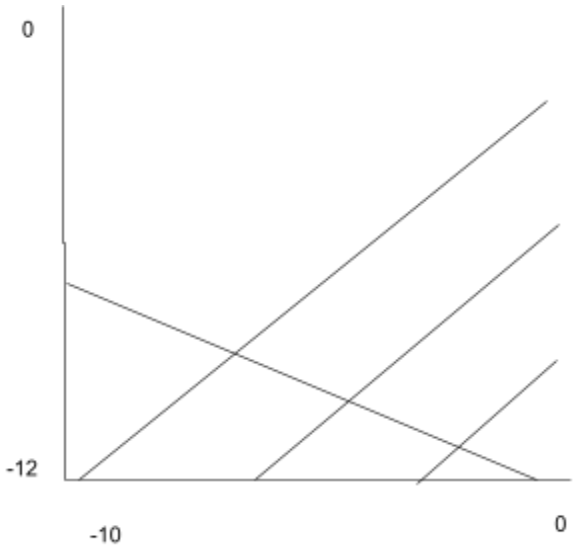
2) sketch

File included as “derivative_test_plt.png”

3) In this case we are worried about the positive slope of the extrap diff graph. The notes tell us that the error should be relatively proportional to h^4 and the slope itself comes out to around +4. The +4 converted to log-log = log(h^4) which equals 4*log(h) and this verifies our slope of 4 is correct.

4) The source of the errors on the left side is the round-off error caused by the machine precision. Due to the algorithms being affected th samee, the slopes should come out to be the same.

Pointer Games



5) The slopes were the same, but the intercepts were different. When I discussed this with group there was no clear consensus but we believed that it was due to thee exponential we introduced into the system.

Lin Alg

2) eigen vals from python: 1.5, 9.67E-5, 1.69E-1, 6.73E-3
3) The eigen values were th smae
6) I did not use log-log scaling, due to some errors with gnu plot and the fitting. So I was force to use the actual values. Whn talking with my group we talked about a +3.0 intercept would be expected and it turned out to be a +3.1, so yes it was very close to our prediction. The graph is included as hilbert.png.