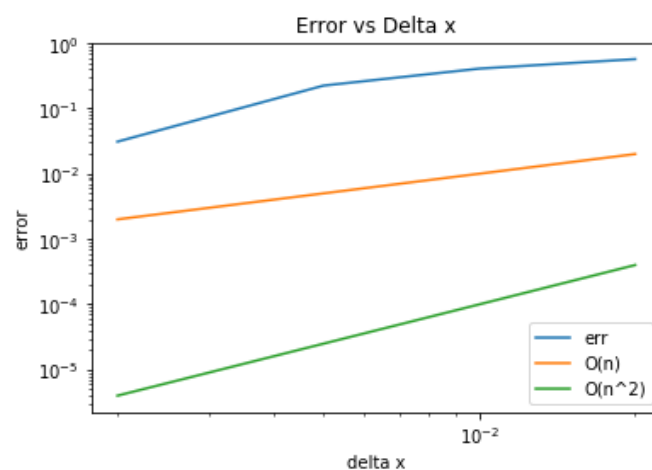
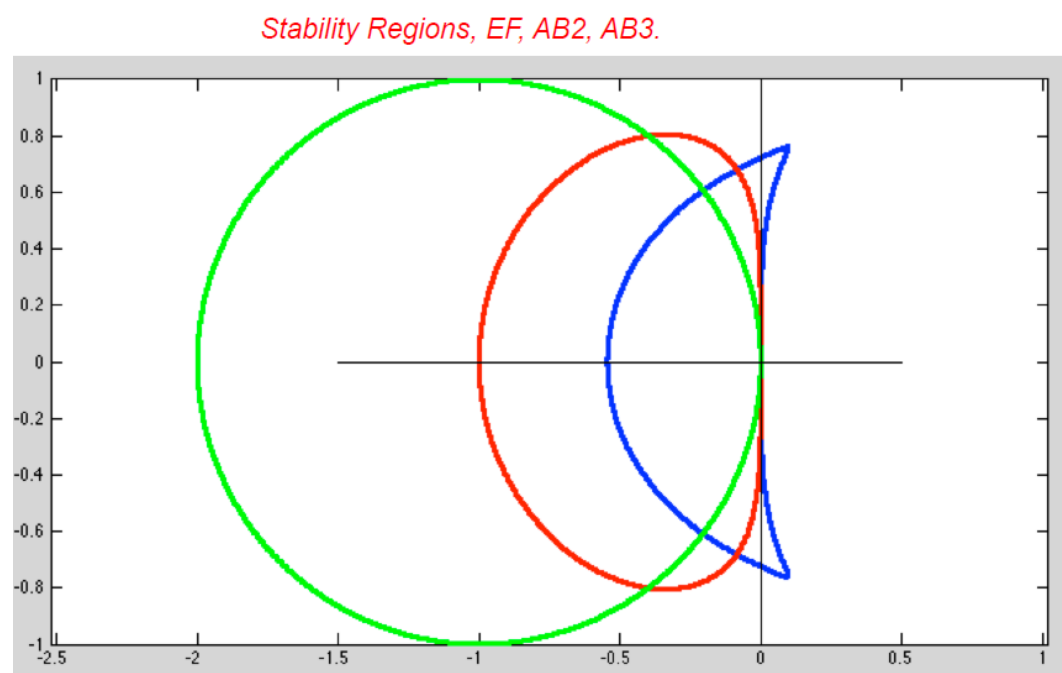


(1)



From the plot above, it is order $O(n^2)$. Because when dx is small, the slope of log-log line is 2, same with the slope of log-log line for $O(n^2)$.

(2)



For centered difference method, the eigenvalue of matrix C is pure imaginary. Also, for AB3 method, the stability region curve encompasses part of the imaginary axis near the origin of $\lambda \cdot dt$ plane (In the plot above). Specifically, in order to be stable, $|\lambda \cdot dt|$ or CFL should be smaller than 0.72. Therefore, in the previous problem, it's stable when CFL=0.7 and unstable when CFL=0.75.