Week 8 Hand-in

NumIntro 2019
Department of Computer Science
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Version 1
Due: November 6th, 08:00

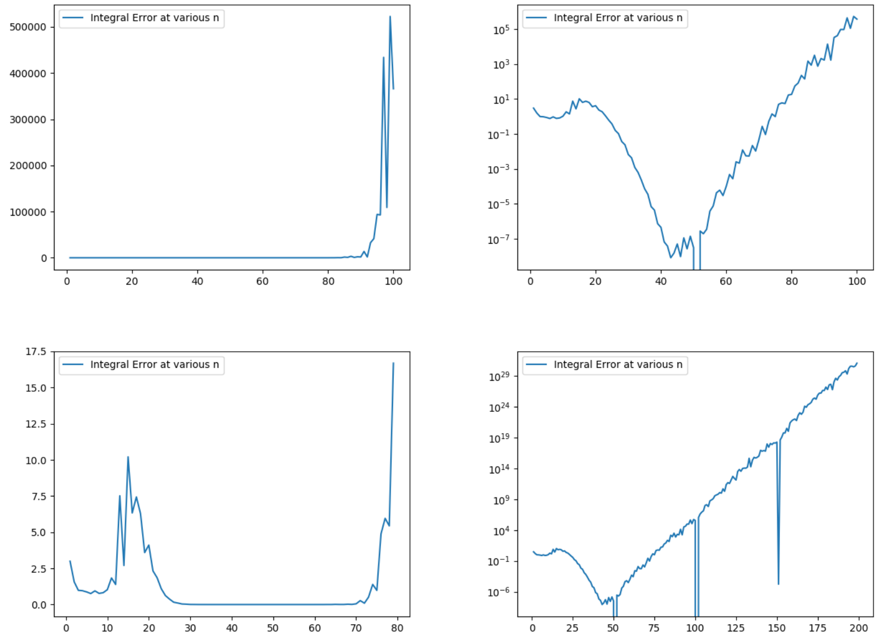
Contents

1. Exercise

(a)

I have plotted the results of this function below in addition to just finding the results for $n = 10, 50, 100$, as can be seen below. The integral error values given the $n - values$ from the exercise look as follows:

$$n = 10 \longrightarrow 1.027977605943556$$
$$n = 50 \longrightarrow 3.122005557761216e - 08$$
$$n = 100 \longrightarrow 365910.5613805074$$



(b)

Calculating the derivative using the richardson method gives us the following values. All values have been calculated with a max number of iterations = 50.

$$t = 0 \longrightarrow d = -1.0000, r = -1.0000$$
$$t = 1 \longrightarrow d = -0.37500, r = -0.37760$$

(c)

The results for the integral error were definitely not expected. I assumed that the accuracy would go up as n went up. However, I would guess that this is due to the fact that the approximating function approaches the real function quite well in the middle of the given interval, as n increases, but diverges significantly at the edges. As can be seen in the graphs above, this error increases exponentially after roughly $n = 50$.

The results for the derivative in $t = 0$ were expected, as that is the true value. The value for $t = 1$ is slightly off the actual result of $-1/e$ or roughly -0.36787. This is to be expected though, as it does not have perfect accuracy.