Problem statement

April 1^{st} 2022

Exercise 1

Compute the roots of the following function f with a tolerance value of 10^{-5}

$$f(x) = \int_0^x \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$$

Performing the numerical approximation of the integral first through simpson's rule and then through trapezoidal's rule. Explain your observations.

Exercise 2

Solve the following integral in $0 \leq x \leq 5$,

$$f(x) = \int_0^x \sqrt{1 + t^3} dt$$

which is elliptic and cannot be solved by means of regular calculus exact methods. Proceed by solving the suitable initial value problem with both versions of Euler's method. Explain the results and the differences in between them.