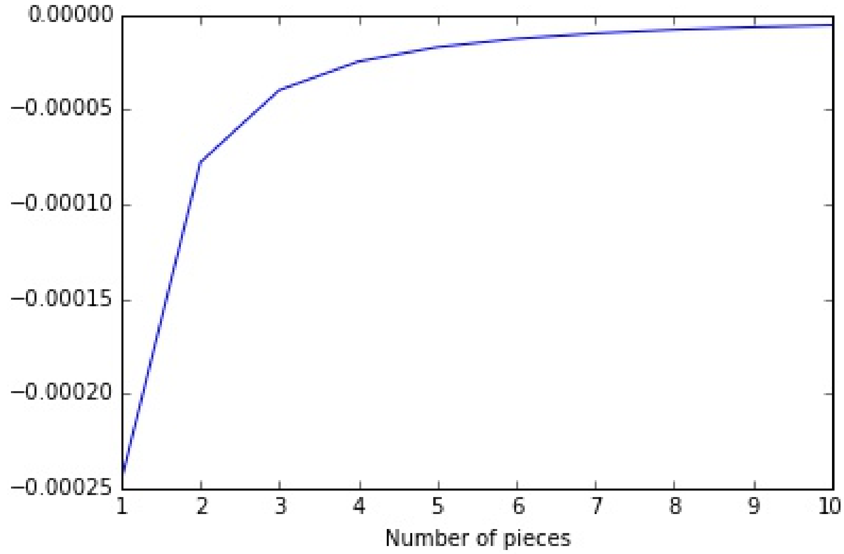


Figure 1: Fractional error of numerical integration as a function of number of intervals.

The basic idea was to caculate the the integral of the function

$$y = x^3 + x^{2/3}$$

This was done both numerically as well as analytically.

For the numerical integration, Simpson's rule was used:

$$\int_a^b f(x)dx \approx \frac{(b-a)}{6}\left(y(a) + 4y((a+b)/2) + y(b)\right)$$

For the analytical integration, the result is given by:

$$\int_a^b f(x)dx = x^4/4 + 3/5x^{5/3}|_a^b$$

The integral was computed between 0 and 10. The numerical integration was about 0.02% off from the analytical one.

I then proceeded to split the Simpson's integration up into multiple steps, and calculated the fractional error as a function of the number of pieces. The results are shown in Figure 1

Table 1 shows the fractional error as a function of the number of pieces:

| | |
|---|---|
| 1 | -0.000245307331841 |
| 2 | -7.7656140706e-05 |
| 3 | -3.95427362471e-05 |
| 4 | -2.44881707436e-05 |
| 5 | -1.68846338361e-05 |
| 6 | -1.24609013845e-05 |
| 7 | -9.63799435511e-06 |
| 8 | -7.71512276632e-06 |
| 9 | -6.34008146724e-06 |
| 10 | -5.31908134828e-06 |

Table 1: Fractional error as a function of number of pieces