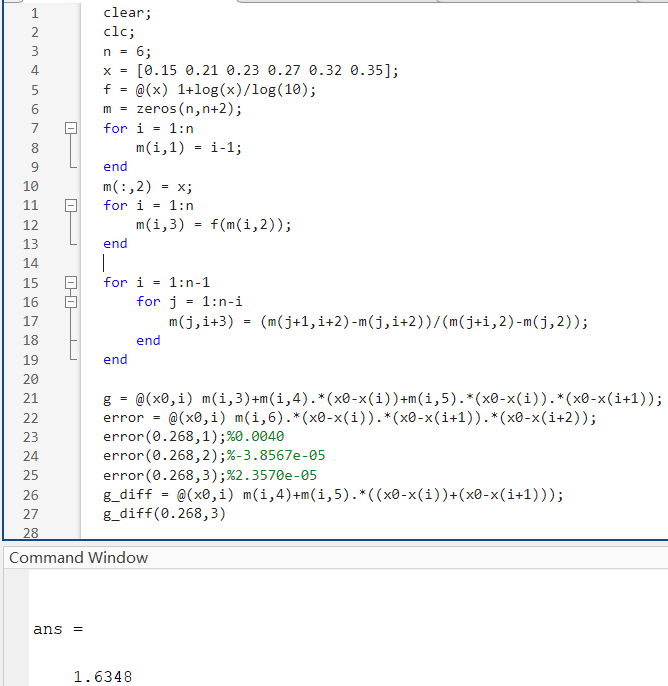
110550126 曾家祐

Numerical methods Assignment 4





We first use the for loop to generate the divided differences table

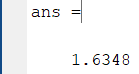
一張含有 文字 的圖片

自動產生的描述

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| i |  |  |  |  |  |  | F[xi…xi+5] |
| 0 | 0.15 | 0.1761 | 2.4355 | -5.7505 | 15.3474 | -38.8116 | 94.5795 |
| 1 | 0.21 | 0.3222 | 1.9754 | -3.9088 | 8.7494 | -19.8957 |  |
| 2 | 0.23 | 0.3617 | 1.7409 | -2.9464 | 5.9640 |  |  |
| 3 | 0.27 | 0.4314 | 1.4757 | -2.2307 |  |  |  |
| 4 | 0.32 | 0.5051 | 1.2973 |  |  |  |  |
| 5 | 0.35 | 0.5441 |  |  |  |  |  |

And calculate the error of quadratic interpolating polynomial, since the error of start from x(3) have min error, we calculate the f’(0.268)from x3 and use three point(0.23, 0.3617) (0.27,0.4314) (0.32,0.5051)

f’(0.268) = 1.6348



一張含有 文字, 螢幕擷取畫面, 數字, 字型 的圖片

自動產生的描述

We first use the for loop to generate the divided differences table

一張含有 文字 的圖片

自動產生的描述

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Xi | fi | △fi | △2fi | △3fi | △4fi | △5fi | △6fi |
| 0.3 | 0.3985 | 0.2613 | -0.0064 | -0.0022 | 0.0003 | 0.0001 | 0 |
| 0.5 | 0.6598 | 0.2549 | -0.0086 | -0.0018 | 0.0004 | 0.0001 |  |
| 0.7 | 0.9147 | 0.2464 | -0.0104 | -0.0014 | 0.0005 |  |  |
| 0.9 | 1.1611 | 0.2360 | -0.0118 | -0.0010 |  |  |  |
| 1.1 | 1.3971 | 0.2241 | -0.0128 |  |  |  |  |
| 1.3 | 1.6212 | 0.2113 |  |  |  |  |  |
| 1.5 | 1.8325 |  |  |  |  |  |  |

(a)

一張含有 文字, 字型, 行, 螢幕擷取畫面 的圖片

自動產生的描述

We choose the starting point 0.7

the f’(0.72) =1.2510

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自動產生的描述

(b)

一張含有 文字, 字型, 螢幕擷取畫面, 數字 的圖片

自動產生的描述

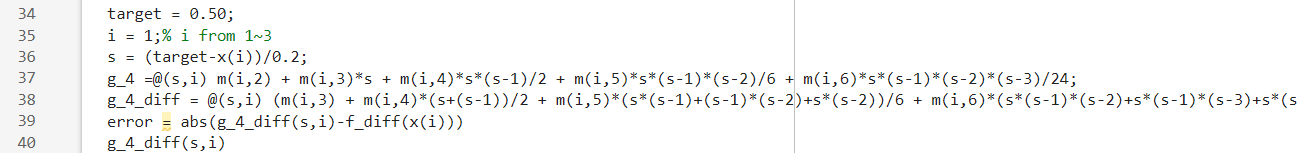
We choose the starting point 1.3

the f’(1.33) =1.0790

一張含有 文字, 螢幕擷取畫面, 字型, 設計 的圖片

自動產生的描述

(c)

 We choose the starting point 0.3

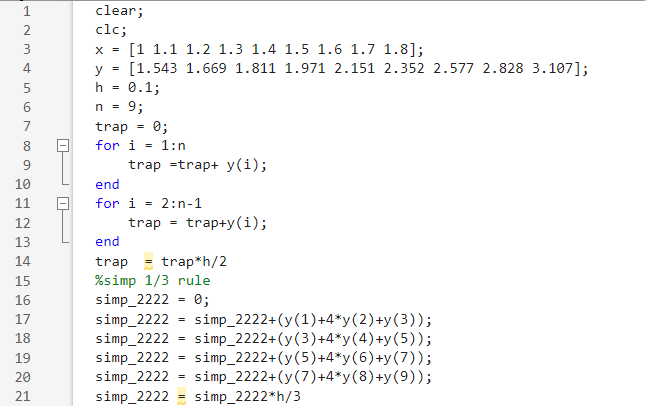
the f’(0.5) =1.2925

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自動產生的描述

一張含有 文字, 筆跡, 文件, 信 的圖片

自動產生的描述



we first initial the points and use it to calculate the integral by Simpson’s 1/3 rule and Trapezoidal Rule.

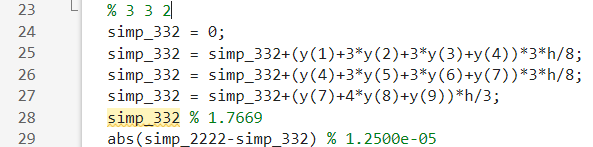
Trapezoidal Rule: 1.7684

Simpson’s 1/3 Rule:1.7669

For 9 points (8 panels), we can use two 3/8 rule and one 1/3 rule (3+3+2 = 8) to calculate the integral

There are three possible:

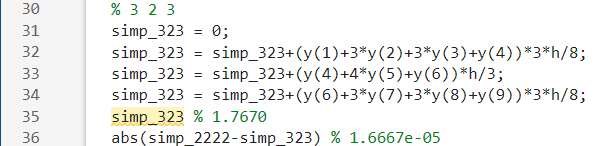
1.3/8 rule on points(1~4),(4~7) 1/3 rule on point (7~9)



Ans = 1.7669

Error = 1.25e-05

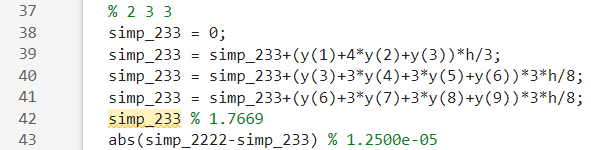
2.3/8 rule on points(1~4),(6~9) 1/3 rule on point(4~6)



Ans = 1.7670

Error = 1.6667e-05

3.3/8 rule on points(3~6),(6~9) 1/3 rule on point (1~3)



Ans = 1.7669

Error = 1.25e-05

The minimum error is 1.25e-05 (error is compare with Simpson 1/3 rule)

Ans = 1.7669

With 3/8 rule on points(1~4),(4~7) 1/3 rule on point (7~9)

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自動產生的描述

First we initial the interval a, b and the function f. we use the while loop and use if(abs(now-prev)<0.02)to determine how many iteration to run. In while loop we first calculate the points and h and use these value with f(x) to calculate the value of Integrate 𝑓(𝑥) = 1/𝑥 2 over the interval [0.2, 1].

Ans = 4.003227

at 6th iteration with 65 points, h = 0.012500

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自動產生的描述

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自動產生的描述 一張含有 文字, 螢幕擷取畫面, 字型, 白色 的圖片

自動產生的描述

We use two for loop to calculate the single integral outer for loop is two calculate different a,b

And the inner for loop is to calculate the integral by three term Gaussian quadrature.

we get the integral of e^x = 3.23646921, integral of sin(2y) =0.11409502

ans = 0.36926502