$K = \frac{b-a}{n}$ $x_i = a + iK$

Tarea

Aplicar la regla de Simpson compuesta a una integral de la forma

$$\int_a^b \int_{c(x)}^{d(x)} f(x,y)\,dy\,dx$$

Y realizar el programa

$$\int_{c(x)}^{d(x)} f(x,y)\,dy \simeq \frac{h}{3}\left[f(x,c(x)) + 2\sum_{j=1}^{\frac{m}{2}-1} f(x,y_{2j}) + 4\sum_{j=1}^{m/2} f(x,y_{2j-1}) + f(x,d(x))\right]$$

$h(x) = \frac{d(x)-c(x)}{m}$ y $y_j = c(x) + jh(x)$

$$\int_a^b f(x)\,dx \simeq \frac{K}{3}\left[f(a) + 2\sum_{i=1}^{n/2-1} f(x_{2i}) + 4\sum_{i=1}^{n/2} f(x_{2i-1}) + f(b)\right]$$

$$\Rightarrow \int_a^b \int_{c(x)}^{d(x)} f(x,y)\,dx\,dy \simeq$$

$$\frac{K}{3}\left[\frac{h(a)}{3}\left[f(a,c(a)) + 2\sum_{j=1}^{\frac{m}{2}-1} f(a,c(a)+2jh(a)) + 4\sum_{j=1}^{m/2} f(a,c(a)+(2j-1)h(a)) + f(a,d(a))\right]\right.$$

$$+ 2\sum_{i=1}^{n/2-1} \frac{h(a+2iK)}{3}\left[f(a+2iK, c(a+2iK))\right.$$

$$+ 2\sum_{j=1}^{\frac{m}{2}-1} f(a+2iK, c(a+2iK) + 2jh(a+2iK))$$

$$\left. + 4\sum_{j=1}^{m/2} f(a+2iK, c(a+2iK)+(2j-1)h(a+2iK)) + f(a+2iK, d(a+2iK))\right]$$

$$+ 4\sum_{i=1}^{n/2} \frac{h(a+(2i-1)K)}{3}\left[f(a+(2i-1)K, c(a+(2i-1)K)\right.$$

$$+ 2\sum_{j=1}^{\frac{m}{2}-1} f(a+(2i-1)K, c(a+(2i-1)K + 2jh(a+(2i-1)K)$$

$$+ 4\sum_{j=1}^{m/2} f(a+(2i-1)K, c(a+(2i-1)K+(2j-1)h(a+2i-1)K)$$

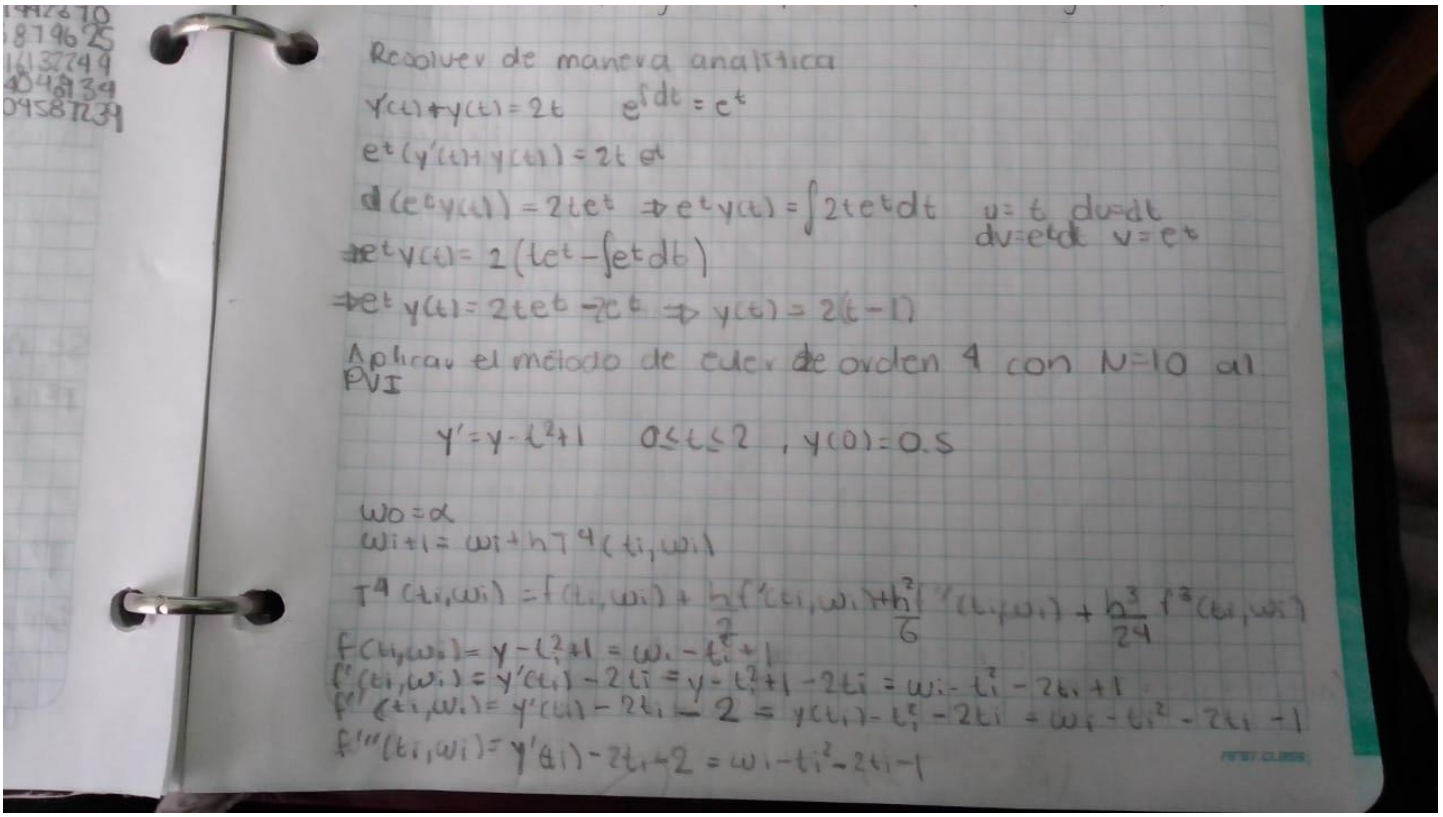
$$\left. + f(a+(2i-1)K, d(a+(2i-1)K)\right]$$

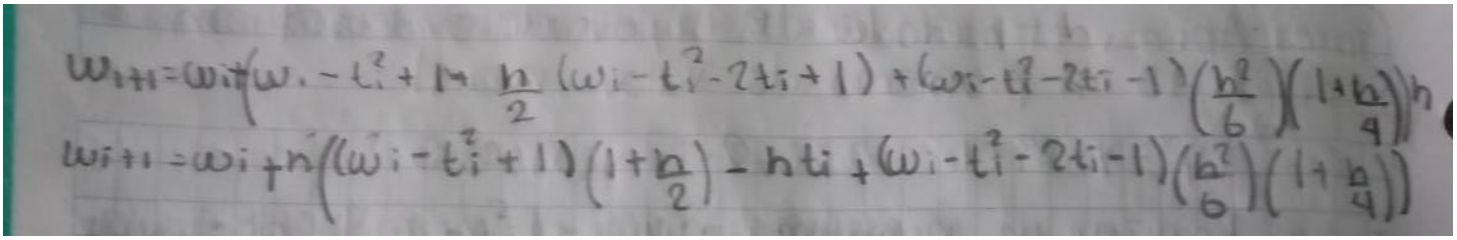
$$+ \frac{h(b)}{3}\left[f(b,c(b)) + 2\sum_{j=1}^{\frac{m}{2}-1} f(b,c(b)+2jh(b)) + 4\sum_{j=1}^{m/2} f(b,c(b)+(2j-1)h(b)\right.$$

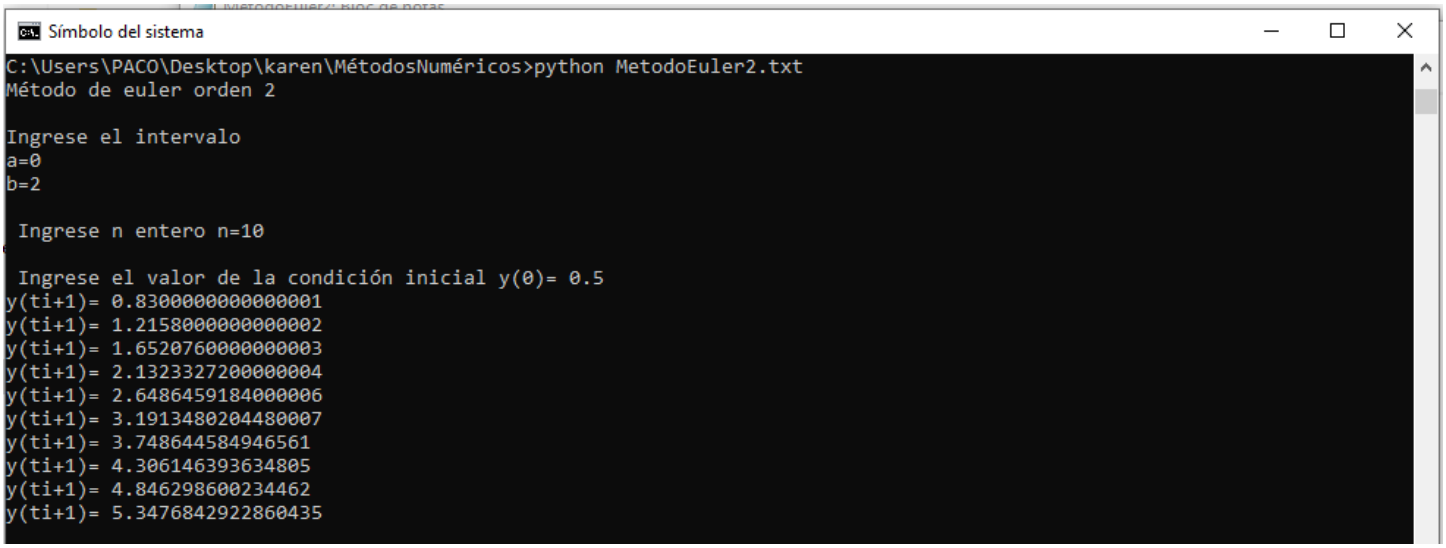
$$\left. + f(b,d(b))\right]$$

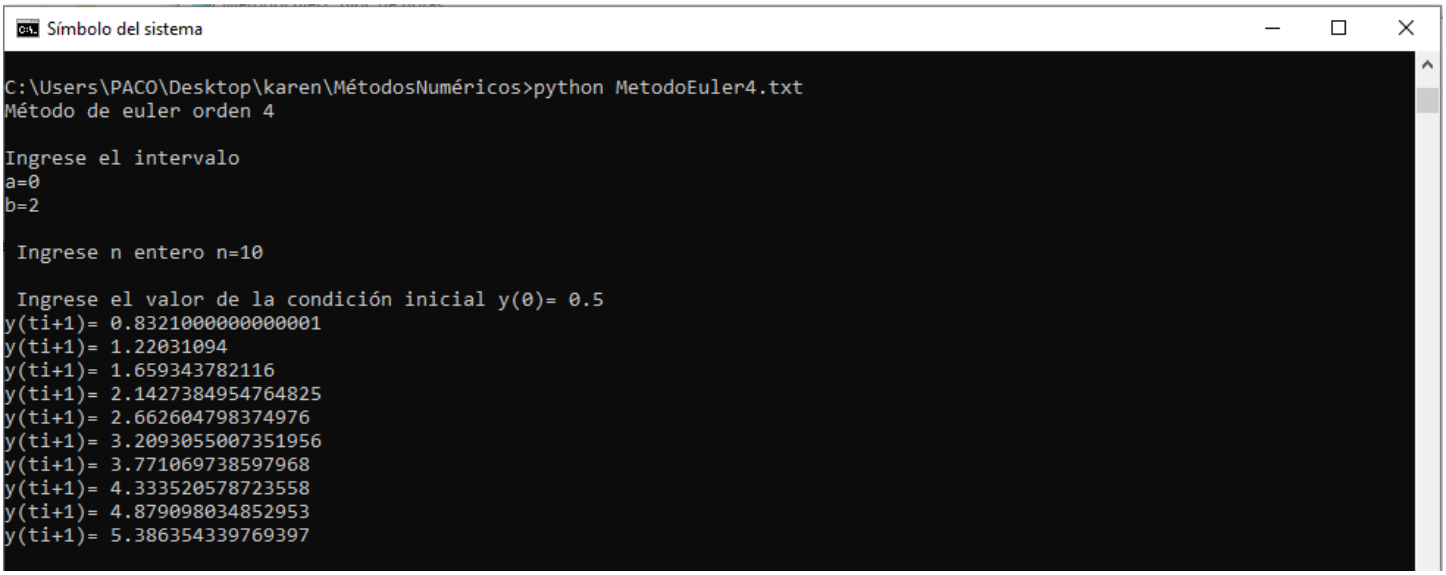
Símbolo del sistema

```
C:\Users\PACO\Desktop\karen\MétodosNuméricos>python MetodoEuler.txt
Método de euler

Ingrese el intervalo

a= 0
b= 1
Ingrese n entero= 10

 Ingrese la función f(t,y)= 2*t-y

 Ingrese el valor de la condición inicial y(0)= -1
y(ti+1)= -0.9
y(ti+1)= -0.79
y(ti+1)= -0.671
y(ti+1)= -0.5439
y(ti+1)= -0.40951000000000004
y(ti+1)= -0.268559
y(ti+1)= -0.12170309999999998
y(ti+1)= 0.03046721000000005
y(ti+1)= 0.18742048900000005
y(ti+1)= 0.34867844010000004
```






Símbolo del sistema
C:\Users\PACO\Desktop\karen\MétodosNuméricos>python MetodoEuler2.txt
Método de euler orden 2
Ingrese el intervalo
a=0
b=2
Ingrese n entero n=10
Ingrese el valor de la condición inicial y(0)= 0.5
y(ti+1)= 0.8300000000000001
y(ti+1)= 1.2158000000000002
y(ti+1)= 1.6520760000000003
y(ti+1)= 2.1323327200000004
y(ti+1)= 2.6486459184000006
y(ti+1)= 3.1913480204480007
y(ti+1)= 3.748644584946561
y(ti+1)= 4.306146393634805
y(ti+1)= 4.846298600234462
y(ti+1)= 5.3476842922860435


Símbolo del sistema
C:\Users\PACO\Desktop\karen\MétodosNuméricos>python MetodoEuler4.txt
Método de euler orden 4
Ingrese el intervalo
a=0
b=2
Ingrese n entero n=10
Ingrese el valor de la condición inicial y(0)= 0.5
y(ti+1)= 0.8321000000000001
y(ti+1)= 1.22031094
y(ti+1)= 1.659343782116
y(ti+1)= 2.1427384954764825
y(ti+1)= 2.662604798374976
y(ti+1)= 3.2093055007351956
y(ti+1)= 3.771069738597968
y(ti+1)= 4.333520578723558
y(ti+1)= 4.879098034852953
y(ti+1)= 5.386354339769397