ENG211 HOMEWORK #1

Question 1:

I calculated the area of y = x^(3/4)/5 x=0 to 3 using Monte Carlo method;

I randomly generated an X 0 to 3 1007 times then I randomly generated an y 0 to

0.781545276670209 (Exact Value) then I created f(x) from randomly generated x 1007 times

Then I take average of every F(x) after that , I calculated The Error with Subtraction approximated value

From True Value after then I calculated Percent Relative Error.

Question 2:

I calculated the area of y= x\*e^(-4x^2) x=0 t0 1 using Monte Carlo method;

I did the almost same thing in the question 1 only difference is the I used exp() function in excel file.

I randomly generated an X 0 to 1 2503 times, then I randomly generated an y 0 to

0.1227105451389082 (Exact Value) then I created f(x) from randomly generated x 2503 times

Then I take average of every F(x) after that , I calculated The Error with Subtraction approximated value

From True Value after then I calculated Percent Relative Error.

Question 3:

In a for loop looping 1000 times ; I randomly generated x and y using rand() command after than I take their power to 2 and summate them and take their root that process, gives an opportunity check if this hit inside the circle or outside If x^2 + y^2 < 1 that gives us this hit is inside of circle . After that I take (hits inside of circle / all hits) and multiple it with 4 and that gives us something close the PI;

Question 4:

I calculated the area of y= cos(x)sin(x) x=0 to PI/2 using Monte Carlo method;

Once again I did the almost same thing in Question 1 and 2 only difference I used trigonometric functions like SIN(). I randomly generated an X 0 to PI/2 1005 times, then I randomly generated an y 0 to 0.5 (Exact Value) then I created f(x) from randomly generated x 1005 times

Then I take average of every F(x) after that , I calculated The Error with Subtraction approximated value

From True Value after then I calculated Percent Relative Error.

Q1:

Format: Excel

File: <https://drive.google.com/open?id=1O_y5kTnu6a0trOS5gquE5ZcyUrV6Pl3y>

Used Functions;

RAND(), SUM(), IF()

Formulas;

=RAND()\*3, =RAND()\*0.781545276670209,

=4/35\*(B3^(7/4))

=IF(D3>C3,1,0)

=IF(E3>D3,1,1)

=SUM(D3:D1009)/1007

=0.781545276670209-G3

=(H3/0.781545276670209)\*100

Q2:

Format: Excel

File: <https://drive.google.com/open?id=1O_y5kTnu6a0trOS5gquE5ZcyUrV6Pl3y>

Used Functions;

RAND(), SUM(), EXP(), IF()

Formulas;

=RAND(), =RAND()\*0.122710545138908

=B3\*EXP(-4\*B3^2)

=IF(D3>C3,1,0), =IF(E3>D3,1,1)

=SUM(D3:D2505)/2503

=0.122710545138908-G3, =(H3/0.122710545138908)\*100

Q3:

Format: C File

Files: <https://drive.google.com/open?id=1OjkfBeua7VKp-nTxRIjgSuMRFc1GgDYx> <https://drive.google.com/open?id=1WCYKf4k_ndbAhhii4dZA4ngNBLse0ofz>

Used Functions;

for(), if() , rand(), sqrt(), pow() , printf() ,scanf()

Formulas;

x = (double)rand() / RAND\_MAX;

y = (double)rand() / RAND\_MAX;

t = sqrt(pow(x, 2) + pow(y, 2));

pi = 4 \* (hitsinside / hits);

Q4:

Format: Excel

File: <https://drive.google.com/open?id=1O_y5kTnu6a0trOS5gquE5ZcyUrV6Pl3y>

Used Functions;

RAND(), SUM(), SIN(), IF()

Formulas;

=RAND()\*90, =RAND()\*0.5

=((SIN(B4))^2)/2

=IF(D3>C3,1,0)

=IF(E3>D3,1,1)

=SUM(D3:D1007)/1005

=0.5-G3 , =(H3/0.5)\*100

You can find the Excel File and C code in this link;

https://drive.google.com/drive/folders/1R8rdi9-s56MtMw6Y\_yTqRX--lfekEAs9?usp=sharing

|  |
| --- |
| Semih Ufuk Güler |
| 200011674 |
| EEE #2 |
| [sufukguler@gmail.com](mailto:sufukguler@gmail.com) |

|  |  |
| --- | --- |
| You can find this things C implementations in couple weeks in my Git Hub repository: | |
|  |  |
| <https://github.com/sufuk/NumericalMethods> |  |
|  |  |
| I am started to write C programs about what we learn in this lesson, | |
| if you check them (in a couple weeks) and give me feedback I will appreciated. | |