

The third serie (N°03)

Solution

Exercice 05 :

This a Pascal program that that calculates the Exponential Series according to taylor's development (using functions):

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} \dots$$

Where the user enters the variable x and the number of terms n .

See the solution on the next page...

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```

Program s_Taylor;
Var
  x, sum: Real;
  n, i: Integer;

Function puissance(x: Real; n: Integer): Real;
Var
  p: Real;
  i: Integer;
Begin
  p := 1;
  For i := 1 To n Do
    p := p * x;
  puissance := p;
End;

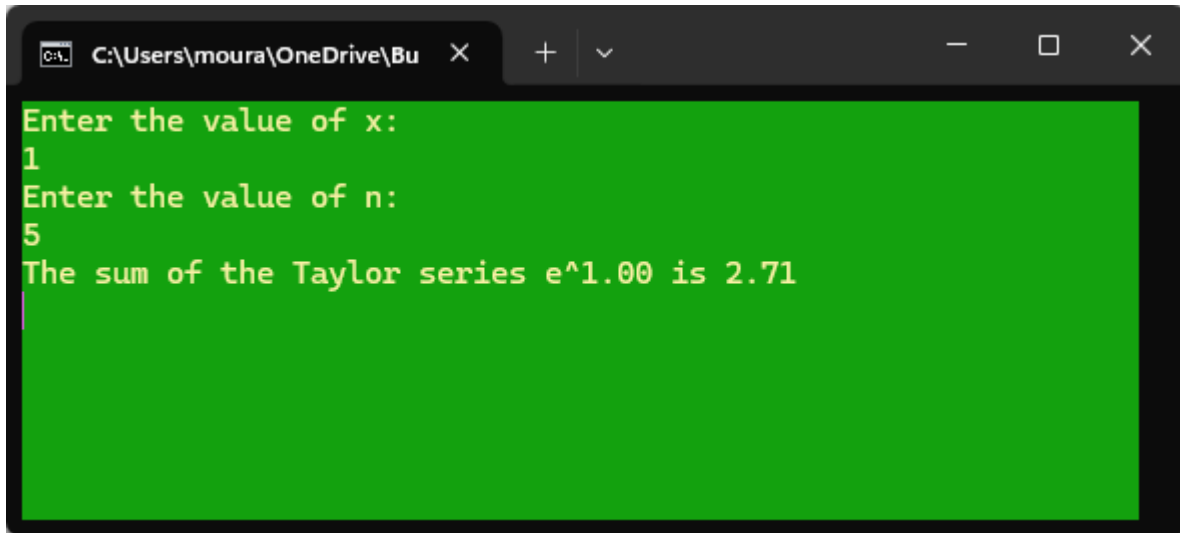
Function factorial(n: Integer): Real;
Var
  f: Real;
  i: Integer;
Begin
  f := 1;
  For i := 1 To n Do
    f := f * i;
  factorial := f;
End;

Begin
  Writeln('Enter the value of x:');
  Readln(x);
  Writeln('Enter the value of n:');
  Readln(n);

  sum := 1;
  For i := 1 To n-1 Do
    sum := sum + puissance(x, i) / factorial(i);
  Writeln('The sum of the Taylor series e^', x:0:2, ' is ', sum:0:2);
  Readln;
End.

```

After running the program, here is the display:



A screenshot of a Windows command prompt window. The title bar shows the path 'C:\Users\moura\OneDrive\Bu' and standard window controls. The command prompt has a green background and white text. The text displayed is: 'Enter the value of x:', '1', 'Enter the value of n:', '5', and 'The sum of the Taylor series e^1.00 is 2.71'.

```
C:\Users\moura\OneDrive\Bu > Enter the value of x:  
1  
Enter the value of n:  
5  
The sum of the Taylor series e^1.00 is 2.71
```

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