Expression exploration

Jovanio Jorjinni (mojno verit)

May 4, 2023

1 Introduction

Worryingly, the importance of the derriviation is underestimated nowadays. In this extraordinary article I will show that the calculation and use of the derivative can be very interesting Our British scientists with Italian names living in America have spent about **17 YEARS, 14 MONTHS, and 47 DAYS** studying the derivative problem and writing universal and unique differentiator. This article fully presents the results of their work!

With this article, I want to restore the former greatness of mathematics and help the humanity, and what's more, most importantly, first-year students of the Moscow Institute of Physics and Technology!!!

2 Some basic knowledge about researching problem...

Parameters and constants we use in this work (all data is qualified):

Constants (3):
e = 2.718282
pi = 3.141593
AbObA = 1337.228690

Variables (1):
x = 9.000000

Parameters of exploration :
Number of differentiates = 2
Macloren's accuracy = 3
Tanget point = 0.000000
Delta coverage of tangent point = 0.500000
Graph diapasone = $[-2 : 2]$

So let's calculate smth with a given function:

$$f(x) = \sin(4 \cdot x) \cdot e^x$$

Firstly, let's insert all constants:

$$f(x) = \sin(4 \cdot x) \cdot 2.71828^x$$

3 Exploration of the expression

- Calculation a value of function in the point

BRITISH SCIENTISTS WERE SHOCKED, WHEN THEY COUNT IT!!!
In the point $M_0(x_0) = (9.000)$ expression's value = -8036.46727

- Finding the first derivation of function

Personally, I've always thought about first derivation of something like that function... Haven't you? But now, by using informatics and math skills I feel that I'm prepared enough to calculate it!

`1 step:` Finding a derivation of x

While preparing for exams, I learned a lot of new things, for example:

$(x)' =$

$= 1$

`2 step:` Finding a derivation of 2.71828^x

Only after two cups of beer you might understand it:

$(2.71828^x)' =$

$= 1 \cdot 2.71828^x$

`3 step:` Finding a derivation of x

Never say it to girls:

$(x)' =$

$= 1$

`4 step:` Finding a derivation of 4

Only by using special skills we might know::

$(4)' =$ **... = [top secret] = ...** $=$

$= 0$

`5 step:` Finding a derivation of $4 \cdot x$

What if:

$(4 \cdot x)' =$

$= 4$

`6 step:` Finding a derivation of $\sin(4 \cdot x)$

Even my two-aged sister knows that:

$(\sin(4 \cdot x))' =$

$= 4 \cdot \cos(4 \cdot x)$

`7 step:` Finding a derivation of $\sin(4 \cdot x) \cdot 2.71828^x$

The first task in MIPT was to calculate:

$(\sin(4 \cdot x) \cdot 2.71828^{x})' =$

$= 4 \cdot \cos(4 \cdot x) \cdot 2.71828^{x} + 1 \cdot 2.71828^{x} \cdot \sin(4 \cdot x)$

Congratulations! **The first derivation of the expression** is:

$f'(x) = 4 \cdot \cos(4 \cdot x) \cdot 2.71828^{x} + 1 \cdot 2.71828^{x} \cdot \sin(4 \cdot x)$

In the point $M_0(x_0) = (9.000)$ **it's value = -12184.06933**

- Finding the 2 derivation

1) Let's find **the 1 derivation** of the given function:

`1 step:` Finding a derivation of x

Never say it to girls:

$(x)' =$

$= 1$

`2 step:` Finding a derivation of 2.71828^{x}

It's simple as fuck:

$(2.71828^{x})' =$ **... = [top secret] = ...** $=$

$= 1 \cdot 2.71828^{x}$

`3 step:` Finding a derivation of x

As we know:

$(x)' =$

$= 1$

`4 step:` Finding a derivation of 4

I was asked not to tell anyone that:

$(4)' =$

$= 0$

`5 step:` Finding a derivation of $4 \cdot x$

Only after two cups of beer you might understand it:

$(4 \cdot x)' =$ **... = [top secret] = ...** $=$

$= 4$

`6 step:` Finding a derivation of $\sin(4 \cdot x)$

Even my two-aged sister knows that:

$(\sin(4 \cdot x))' =$

$= 4 \cdot \cos(4 \cdot x)$

`7 step:` Finding a derivation of $\sin(4 \cdot x) \cdot 2.71828^{x}$

Even my two-aged sister knows that:

$(\sin(4 \cdot x) \cdot 2.71828^{x})' =$

$= 4 \cdot \cos(4 \cdot x) \cdot 2.71828^{x} + 1 \cdot 2.71828^{x} \cdot \sin(4 \cdot x)$

So **the 1 derivation** of the function is:

$4 \cdot \cos(4 \cdot x) \cdot 2.71828^{x} + 1 \cdot 2.71828^{x} \cdot \sin(4 \cdot x)$

2) Let's find **the 2 derivation** of the given function:

`1 step:` Finding a derivation of x

When I was a child, my father always told me: "Remember, son:

$(x)' =$

$= 1$

`2 step:` Finding a derivation of 4

I have no words to describe this fact:

$(4)' =$ **... = [top secret] = ...** $=$

$= 0$

`3 step:` Finding a derivation of $4 \cdot x$

My roommate mumbled it in his sleep all night:

$(4 \cdot x)' =$ **... = [top secret] = ...** $=$

$= 4$

`4 step:` Finding a derivation of $\sin(4 \cdot x)$

I have no words to describe this fact:

$(\sin(4 \cdot x))' =$ **... = [top secret] = ...** $=$

$= 4 \cdot \cos(4 \cdot x)$

`5 step:` Finding a derivation of x

While preparing for exams, I learned a lot of new things, for example:

$(x)' =$

$= 1$

`6 step:` Finding a derivation of 2.71828^x

It's really easy to find:

$(2.71828^x)' =$

$= 1 \cdot 2.71828^x$

`7 step:` Finding a derivation of 1

What if:

$(1)' =$ **... = [top secret] = ...** $=$

$= 0$

`8 step:` Finding a derivation of $1 \cdot 2.71828^x$

You should be aware of the fact that:

$(1 \cdot 2.71828^x)' =$

$= 1 \cdot 1 \cdot 2.71828^x$

`9 step:` Finding a derivation of $1 \cdot 2.71828^x \cdot \sin(4 \cdot x)$

A true prince must know that:

$(1 \cdot 2.71828^x \cdot \sin(4 \cdot x))' =$

$= 1 \cdot 1 \cdot 2.71828^x \cdot \sin(4 \cdot x) + 4 \cdot \cos(4 \cdot x) \cdot 1 \cdot 2.71828^x$

`10 step:` Finding a derivation of x

For centuries, people have hunted for the secret knowledge that:

$(x)' =$

$= 1$

`11 step:` Finding a derivation of 2.71828^x

I spend the hole of my life to find the answer and finally it's:

$(2.71828^x)' =$ **... = [top secret] = ...** $=$

$= 1 \cdot 2.71828^x$

`12 step:` Finding a derivation of x

Never say it to girls:

$(x)' =$

$= 1$

`13 step:` Finding a derivation of 4

It's really easy to find:

$(4)' =$

$= 0$

`14 step:` Finding a derivation of $4 \cdot x$

Sometimes I hear the same voice in my head, it always says:

$(4 \cdot x)' =$ **... = [top secret] = ...** $=$

$= 4$

`15 step:` Finding a derivation of $\cos(4 \cdot x)$

Even my two-aged sister knows that:

$(\cos(4 \cdot x))' =$

$= 4 \cdot (-1) \cdot \sin(4 \cdot x)$

`16 step:` Finding a derivation of 4

Only by using special skills we might know::

$(4)' =$

$= 0$

`17 step:` Finding a derivation of $4 \cdot \cos(4 \cdot x)$

My friends always beat me, because I didn't know that:

$(4 \cdot \cos(4 \cdot x))' =$ **... = [top secret] = ...** $=$

$= 4 \cdot 4 \cdot (-1) \cdot \sin(4 \cdot x)$

`18 step:` Finding a derivation of $4 \cdot \cos(4 \cdot x) \cdot 2.71828^x$

A true prince must know that:

$(4 \cdot \cos(4 \cdot x) \cdot 2.71828^x)' =$ **... = [top secret] = ...** $=$

$= 4 \cdot 4 \cdot (-1) \cdot \sin(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot 4 \cdot \cos(4 \cdot x)$

`19 step:` Finding a derivation of $4 \cdot \cos(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot \sin(4 \cdot x)$

Sometimes I hear the same voice in my head, it always says:

$(4 \cdot \cos(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot \sin(4 \cdot x))' =$

$= 4 \cdot 4 \cdot (-1) \cdot \sin(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot 4 \cdot \cos(4 \cdot x) + 1 \cdot 1 \cdot 2.71828^x \cdot \sin(4 \cdot x) + 4 \cdot \cos(4 \cdot x) \cdot 1 \cdot 2.71828^x$

So **the 2 derivation** of the function is:

$$4 \cdot 4 \cdot (-1) \cdot \sin(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot 4 \cdot \cos(4 \cdot x) + 1 \cdot 1 \cdot 2.71828^x \cdot \sin(4 \cdot x) + 4 \cdot \cos(4 \cdot x) \cdot 1 \cdot 2.71828^x$$

Finally... The 2 derivation of the expression:

$$f^{(2)}(\mathrm{x}) = 4 \cdot 4 \cdot (-1) \cdot \sin(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot 4 \cdot \cos(4 \cdot x) + 1 \cdot 1 \cdot 2.71828^x \cdot \sin(4 \cdot x) + 4 \cdot \cos(4 \cdot x) \cdot 1 \cdot 2.71828^x$$

BRITISH SCIENTISTS WERE SHOCKED AGAIN, BECAUSE THEY COUNT THE 2 DERIVATION OF THIS FUNCTION!!!

In the point $M_0(x_0) = (9.000)$ **it's value = 112251.80501**

- Finding partical derivations

Partical derivation of the expression on the variable **x**:

$\frac{\partial f}{\partial x} = 4 \cdot \cos(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot \sin(4 \cdot x)$

In the point $M_0(x_0) = (9.000)$ **it's value = -12184.06933** !!!

- Finding full derivation

Full derivation:

$$\sqrt{(4 \cdot \cos(4 \cdot x) \cdot 2.71828^x + 1 \cdot 2.71828^x \cdot \sin(4 \cdot x))^2}$$

In the point $M_0(x_0) = (9.000)$ **it's value = 12184.06933** !!!

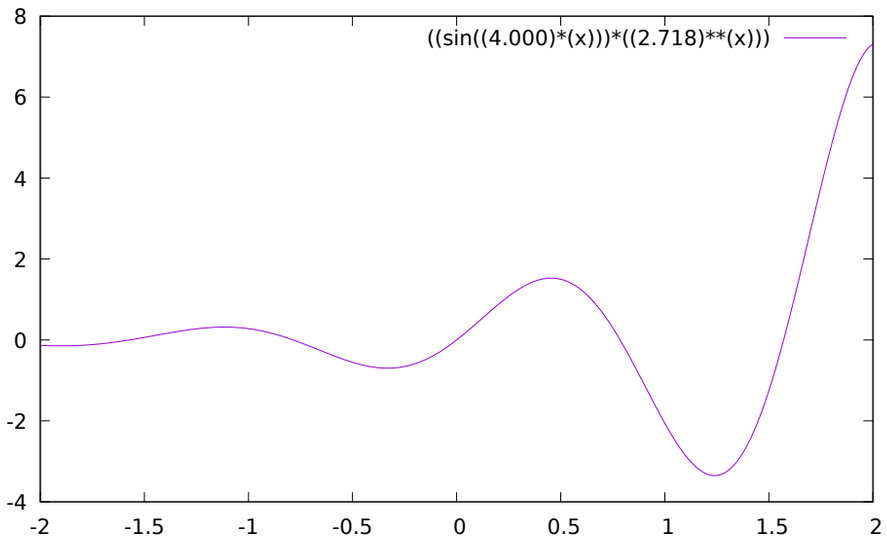
- Decomposing on Macloren's formula

First 3 members of Maklorens decomposition for $x \to x_0 = 9.000$**:**

$$\mathrm{f(x)} = (-8036.47) + (-12184.1) \cdot (x - 9) + 56125.9 \cdot (x - 9)^2 + 71938.8 \cdot (x - 9)^3 + \mathrm{o}((x - 9)^3)$$

- Graphics

Graph of $\mathrm{f(x)} = \sin(4 \cdot x) \cdot 2.71828^x$ on the diapasone $x \in [-2 : 2]$:

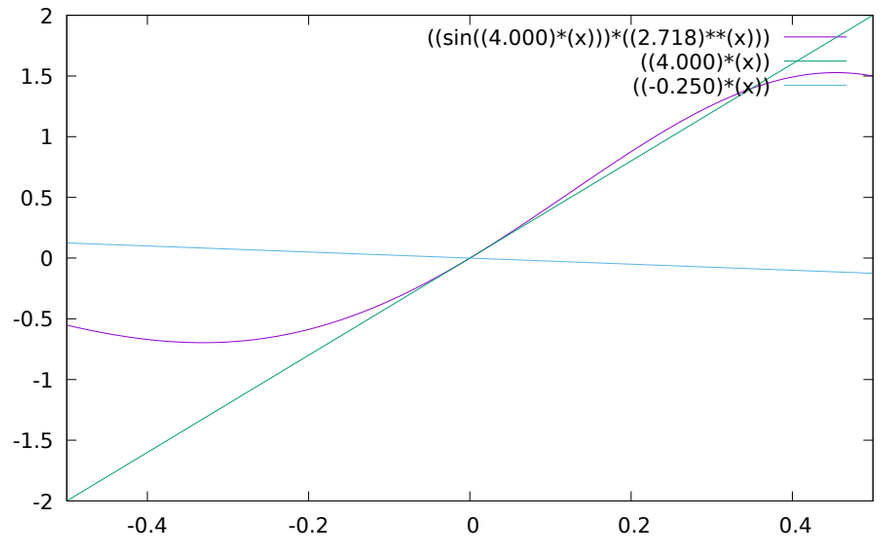


- Equations in the point

Tangent equation in $x_0 = 0.000$:
$\mathrm{f(x)} = 4 \cdot x$

Normal equation in $x_0 = 0.00000$:
$\mathrm{f(x)} = (-0.25) \cdot x$

Their graphs in $\delta = 0.500$ coverage of the point $x_0 = 0.000$:



4 Conclusion

Thanks Ded for this amazing code experience and a lot of useful advice and care! Happy New Year!!! (Programming language is coming soon...)

Repository of the author
Follow for more!
Or watch us on YouTube!