Expression exploration

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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 (3):
a = 3.141500
kek = 13.000000
x = 1.000000

Parameters of exploration :
Number of differentiates = 2
Macloren's accuracy = 3
Tanget point = 3.000000
Delta coverage of tangent point = 2.500000
Graph diapasone = $[-10 : 10]$

So let's calculate smth with a given function:

$$\text{f(a, kek, x)} = \cos\left(a + \frac{kek}{1.000^{AbObA}}\right) + \ln\left(1.000 + x \cdot kek \cdot (1.000^{(\ln e)} - 0.000)\right)$$

Firstly, let's insert all constants:

$$\text{f(a, kek, x)} = \cos\left(a + \frac{kek}{1.000^{1337.229}}\right) + \ln\left(1.000 + x \cdot kek \cdot (1.000^{(\ln 2.718)} - 0.000)\right)$$

And simplify this expression:

$$\text{f(a, kek, x)} = \cos\left(a + kek\right) + \ln\left(1.000 + x \cdot kek\right)$$

3 Exploration of the expression as a function of multiple variables

- Calculation a value of function in the point

BRITISH SCIENTISTS WERE SHOCKED, WHEN THEY COUNT IT!!!
In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ expression's value = 1.73157

- 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 kek

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

$(kek)' =$

$= 1.000$

`2 step:` Finding a derivation of x

Only after two cups of beer you might understand it:

$(x)' =$

$= 1.000$

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

Never say it to girls:

$(x \cdot kek)' =$

$= kek + x$

`4 step:` Finding a derivation of 1.000

Only by using special skills we might know::

$(1.000)' =$ **... = [top secret] = ...** $=$

$= 0.000$

`5 step:` Finding a derivation of $1.000 + x \cdot kek$

What if:

$(1.000 + x \cdot kek)' =$

$= kek + x$

`6 step:` Finding a derivation of $\ln(1.000 + x \cdot kek)$

Even my two-aged sister knows that:

$(\ln(1.000 + x \cdot kek))' =$

$= \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x)$

`7 step:` Finding a derivation of kek

The first task in MIPT was to calculate:

$(kek)' =$

$= 1.000$

`8 step:` Finding a derivation of a

Never say it to girls:

$(a)' =$

$= 1.000$

`9 step:` Finding a derivation of $a + kek$

It's simple as fuck:

$(a + kek)' =$ **... = [top secret] = ...** $=$

$= 2.000$

`10 step:` Finding a derivation of $\cos(a + kek)$

As we know:

$(\cos(a + kek))' =$

$= 2.000 \cdot (-1.000) \cdot \sin(a + kek)$

`11 step:` Finding a derivation of $\cos(a + kek) + \ln(1.000 + x \cdot kek)$

I was asked not to tell anyone that:

$(\cos(a + kek) + \ln(1.000 + x \cdot kek))' =$

$= 2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x)$

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

$$f'(a, kek, x) = 2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000+x \cdot kek} \cdot (kek + x)$$

In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ **it's value = 1.84017**

- Finding the 2 derivation

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

`1 step:` Finding a derivation of kek

Only after two cups of beer you might understand it:

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

$= 1.000$

`2 step:` Finding a derivation of x

Even my two-aged sister knows that:

$(x)' =$

$= 1.000$

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

Even my two-aged sister knows that:

$(x \cdot kek)' =$

$= kek + x$

`4 step:` Finding a derivation of 1.000

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

$(1.000)' =$

$= 0.000$

`5 step:` Finding a derivation of $1.000 + x \cdot kek$

I have no words to describe this fact:

$(1.000 + x \cdot kek)' =$ **... = [top secret] = ...** $=$

$= kek + x$

`6 step:` Finding a derivation of $\ln(1.000 + x \cdot kek)$

My roommate mumbled it in his sleep all night:

$(\ln(1.000 + x \cdot kek))' =$ **... = [top secret] = ...** $=$

$= \frac{1.000}{1.000+x \cdot kek} \cdot (kek + x)$

`7 step:` Finding a derivation of kek

I have no words to describe this fact:

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

$= 1.000$

`8 step:` Finding a derivation of a

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

$(a)' =$

$= 1.000$

`9 step:` Finding a derivation of $a + kek$

It's really easy to find:

$(a + kek)' =$

$= 2.000$

`10 step:` Finding a derivation of $\cos(a + kek)$

What if:

$(\cos(a + kek))' = \ldots = \text{[top secret]} = \ldots =$

$= 2.000 \cdot (-1.000) \cdot \sin(a + kek)$

`11 step:` Finding a derivation of $\cos(a + kek) + \ln(1.000 + x \cdot kek)$

You should be aware of the fact that:

$(\cos(a + kek) + \ln(1.000 + x \cdot kek))' =$

$= 2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x)$

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

$$2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x)$$

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

`1 step:` Finding a derivation of x

A true prince must know that:

$(x)' =$

$= 1.000$

`2 step:` Finding a derivation of kek

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

$(kek)' =$

$= 1.000$

`3 step:` Finding a derivation of $kek + x$

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

$(kek + x)' = \ldots = \text{[top secret]} = \ldots =$

$= 2.000$

`4 step:` Finding a derivation of kek

Never say it to girls:

$(kek)' =$

$= 1.000$

`5 step:` Finding a derivation of x

It's really easy to find:

$(x)' =$

$= 1.000$

`6 step:` Finding a derivation of $x \cdot kek$

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

$(x \cdot kek)' = \ldots = \text{[top secret]} = \ldots =$

$= kek + x$

7 `step`: Finding a derivation of 1.000

Even my two-aged sister knows that:

$(1.000)' =$

$= 0.000$

8 `step`: Finding a derivation of $1.000 + x \cdot kek$

Only by using special skills we might know::

$(1.000 + x \cdot kek)' =$

$= kek + x$

9 `step`: Finding a derivation of 1.000

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

$(1.000)' = \ldots = [\text{top secret}] = \ldots =$

$= 0.000$

10 `step`: Finding a derivation of $\frac{1.000}{1.000+x \cdot kek}$

A true prince must know that:

$(\frac{1.000}{1.000+x \cdot kek})' = \ldots = [\text{top secret}] = \ldots =$

$= \frac{(-1.000)\cdot(kek+x)}{(1.000+x \cdot kek)^{2.000}}$

11 `step`: Finding a derivation of $\frac{1.000}{1.000+x \cdot kek} \cdot (kek + x)$

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

$(\frac{1.000}{1.000+x \cdot kek} \cdot (kek + x))' =$

$= \frac{(-1.000)\cdot(kek+x)}{(1.000+x \cdot kek)^{2.000}} \cdot (kek + x) + 2.000 \cdot \frac{1.000}{1.000+x \cdot kek}$

12 `step`: Finding a derivation of kek

Only by using special skills we might know::

$(kek)' = \ldots = [\text{top secret}] = \ldots =$

$= 1.000$

13 `step`: Finding a derivation of a

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

$(a)' =$

$= 1.000$

14 `step`: Finding a derivation of $a + kek$

She: please, never speak with my dad about math... Me: ok) Also me after homework of matan:

$(a + kek)' = \ldots = [\text{top secret}] = \ldots =$

$= 2.000$

15 `step`: Finding a derivation of $\sin(a + kek)$

My roommate mumbled it in his sleep all night:

$(\sin(a + kek))' = \ldots = [\text{top secret}] = \ldots =$

$= 2.000 \cdot \cos(a + kek)$

16 `step`: Finding a derivation of -1.000

A true prince must know that:

$(-1.000)' = \dots = [\text{top secret}] = \dots =$

$= 0.000$

17 `step:` Finding a derivation of $(-1.000) \cdot \sin(a + kek)$

A true prince must know that:

$((-1.000) \cdot \sin(a + kek))' =$

$= (-1.000) \cdot 2.000 \cdot \cos(a + kek)$

18 `step:` Finding a derivation of 2.000

If someone asked me that in the middle of the night, I wouldn't hesitate to say:

$(2.000)' =$

$= 0.000$

19 `step:` Finding a derivation of $2.000 \cdot (-1.000) \cdot \sin(a + kek)$

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

$(2.000 \cdot (-1.000) \cdot \sin(a + kek))' = \dots = [\text{top secret}] = \dots =$

$= 2.000 \cdot (-1.000) \cdot 2.000 \cdot \cos(a + kek)$

20 `step:` Finding a derivation of $2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x)$

thanks to the results of my colleagues' scientific work, I know that:

$(2.000 \cdot (-1.000) \cdot \sin(a + kek) + \frac{1.000}{1.000 + x \cdot kek} \cdot (kek + x))' =$

$= 2.000 \cdot (-1.000) \cdot 2.000 \cdot \cos(a + kek) + \frac{(-1.000) \cdot (kek + x)}{(1.000 + x \cdot kek)^{2.000}} \cdot (kek + x) + 2.000 \cdot \frac{1.000}{1.000 + x \cdot kek}$

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

$$2.000 \cdot (-1.000) \cdot 2.000 \cdot \cos(a + kek) + \frac{(-1.000) \cdot (kek + x)}{(1.000 + x \cdot kek)^{2.000}} \cdot (kek + x) + 2.000 \cdot \frac{1.000}{1.000 + x \cdot kek}$$

Finally... The 2 derivation of the expression:

$$f^{(2)}(\text{a, kek, x}) = 2.000 \cdot (-1.000) \cdot 2.000 \cdot \cos(a + kek) + \frac{(-1.000) \cdot (kek + x)}{(1.000 + x \cdot kek)^{2.000}} \cdot (kek + x) + 2.000 \cdot \frac{1.000}{1.000 + x \cdot kek}$$

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

In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ **it's value = 2.77280**

- Finding partical derivations

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

$\frac{\partial f}{\partial a} = (-1.000) \cdot \sin(a + 13.000)$

In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ **it's value = 0.42008** !!!

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

$\frac{\partial f}{\partial kek} = (-1.000) \cdot \sin(3.142 + kek) + \frac{1.000}{1.000 + kek}$

In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ **it's value = 0.49151** !!!

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

$\frac{\partial f}{\partial x} = 13.000 \cdot \frac{1.000}{1.000 + 13.000 \cdot x}$

In the point $M_0(a_0, kek_0, x_0) = (3.142, 13.000, 1.000)$ **it's value = 0.92857** !!!

- Finding full derivation

Full derivation:

$$\sqrt{((-1.000)\cdot\sin{(a+13.000)})^{2.000}+((-1.000)\cdot\sin{(3.142+kek)}+\frac{1.000}{1.000+kek})^{2.000}+(13.000\cdot\frac{1.000}{1.000+13.000\cdot x})^{2.000}}$$

In the point $M_0(a_0,\ kek_0,\ x_0) = (3.142,\ 13.000,\ 1.000)$ **it's value = 1.13150** !!!

4 Exploration of the expression as a function of the first variable

In this part of the article let's consider the expression as a function of the first variable a:

$$\text{f(a)} = \cos{(a+13.000)}+2.639$$

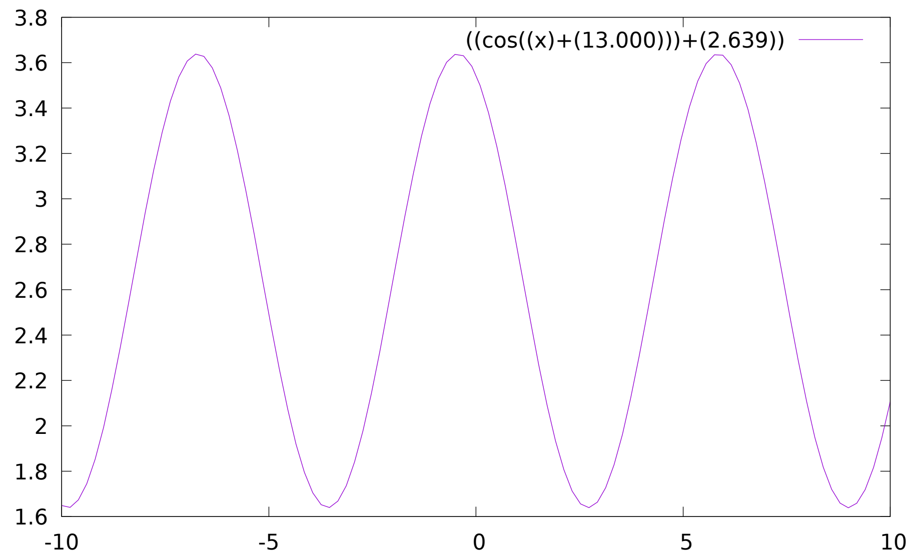
- Decomposing on Macloren's formula

First 3 members of Maklorens decomposition for $a \to a_0 = 3.142$:

$$\text{f(a)} = 1.732+0.420\cdot(a-3.142)+0.454\cdot(a-3.142)^{2.000}+(-0.070)\cdot(a-3.142)^{3.000}+\text{o}((a-3.142)^{3.000})$$

- Graphics

Graph of $\text{f(a)} = \cos{(a+13.000)}+2.639$ on the diapasone $a \in [-10:10]$:

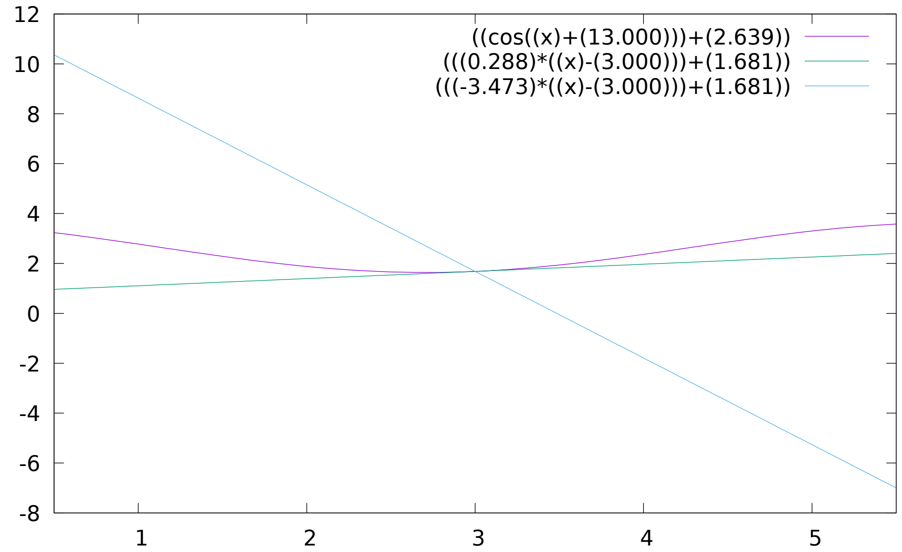


- Equations in the point

Tangent equation in $a_0 = 3.000$:
$\text{f(a)} = 0.288\cdot(a-3.000)+1.681$

Normal equation in $a_0 = 3.00000$:
$\text{f(a)} = (-3.473)\cdot(a-3.000)+1.681$

Their graphs in $\delta = 2.500$ coverage of the point $a_0 = 3.000$:



5 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

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