

# 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):

kek = 13.000000

a = 3.141500

x = 1.000000

Parameters of exploration :

Number of differentiates = 2

Macloren's accuracy = 4

Tanget point = 0.000000

Delta coverage of tangent point = 0.500000

Graph diapasone = [−2 : 2]

So let's calculate smth with a given function:

$$f(\text{kek}, a, x) = \cos kek \cdot a \cdot x^2 - \tan \frac{kek}{e}$$

Firstly, let's insert all constants:

$$f(\text{kek}, a, x) = \cos kek \cdot a \cdot x^2 - \tan \frac{kek}{2.71828}$$

## 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  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  expression's value = 17.10418

- 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 2.71828

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

$$(2.71828)' =$$

$$= 0$$

2 step: Finding a derivation of kek

Only after two cups of beer you might understand it:

$$(kek)' =$$

$$= 1$$

3 step: Finding a derivation of  $\frac{kek}{2.71828}$

Never say it to girls:

$$\left(\frac{kek}{2.71828}\right)' =$$

$$= \frac{2.71828}{7.38906}$$

4 step: Finding a derivation of  $\tan \frac{kek}{2.71828}$

Only by using special skills we might know::

$$\left(\tan \frac{kek}{2.71828}\right)' = \dots = \text{[top secret]} = \dots =$$

$$= 0.367879 \cdot \frac{1}{\left(\cos \frac{kek}{2.71828}\right)^2}$$

5 step: Finding a derivation of x

What if:

$$(x)' =$$

$$= 1$$

6 step: Finding a derivation of x^2

Even my two-aged sister knows that:

$$(x^2)' =$$

$$= 2 \cdot x$$

7 step: Finding a derivation of a

The first task in MIPT was to calculate:

$(a)' =$   
 $= 1$

**8 step:** Finding a derivation of  $kek$

Never say it to girls:

$(kek)' =$   
 $= 1$

**9 step:** Finding a derivation of  $\cos kek$

It’s simple as fuck:

$(\cos kek)' = \dots = \text{[top secret]} = \dots =$   
 $= (-1) \cdot \sin kek$

**10 step:** Finding a derivation of  $\cos kek \cdot a$

As we know:

$(\cos kek \cdot a)' =$   
 $= (-1) \cdot \sin kek \cdot a + \cos kek$

**11 step:** Finding a derivation of  $\cos kek \cdot a \cdot x^2$

I was asked not to tell anyone that:

$(\cos kek \cdot a \cdot x^2)' =$   
 $= ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a$

**12 step:** Finding a derivation of  $\cos kek \cdot a \cdot x^2 - \tan \frac{kek}{2.71828}$

Only after two cups of beer you might understand it:

$(\cos kek \cdot a \cdot x^2 - \tan \frac{kek}{2.71828})' = \dots = \text{[top secret]} = \dots =$   
 $= (((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$

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

$f'(kek, a, x) = (((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$   
In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it’s value = -69.81743**

**- Finding the 2 derivation**

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

**1 step:** Finding a derivation of 2.71828

Even my two-aged sister knows that:

$(2.71828)' =$   
 $= 0$

**2 step:** Finding a derivation of  $kek$

Even my two-aged sister knows that:

$(kek)' =$   
 $= 1$

**3 step:** Finding a derivation of  $\frac{kek}{2.71828}$

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

$(\frac{kek}{2.71828})' =$   
 $= \frac{2.71828}{7.38906}$

**4 step:** Finding a derivation of  $\tan \frac{kek}{2.71828}$

I have no words to describe this fact:

$(\tan \frac{kek}{2.71828})' = \dots = \text{[top secret]} = \dots =$   
 $= 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$

**5 step:** Finding a derivation of  $x$

My roommate mumbled it in his sleep all night:

$(x)' = \dots = \text{[top secret]} = \dots =$   
 $= 1$

**6 step:** Finding a derivation of  $x^2$

I have no words to describe this fact:

$(x^2)' = \dots = \text{[top secret]} = \dots =$   
 $= 2 \cdot x$

**7 step:** Finding a derivation of  $a$

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

$(a)' =$

$$= 1$$

**8 step:** Finding a derivation of  $kek$

It’s really easy to find:

$$(kek)' =$$

$$= 1$$

**9 step:** Finding a derivation of  $\cos kek$

What if:

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

$$= (-1) \cdot \sin kek$$

**10 step:** Finding a derivation of  $\cos kek \cdot a$

You should be aware of the fact that:

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

$$= (-1) \cdot \sin kek \cdot a + \cos kek$$

**11 step:** Finding a derivation of  $\cos kek \cdot a \cdot x^2$

A true prince must know that:

$$(\cos kek \cdot a \cdot x^2)' =$$

$$= ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a$$

**12 step:** Finding a derivation of  $\cos kek \cdot a \cdot x^2 - \tan \frac{kek}{2.71828}$

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

$$(\cos kek \cdot a \cdot x^2 - \tan \frac{kek}{2.71828})' =$$

$$= (((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$$

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

$$((( -1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$$

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

**1 step:** Finding a derivation of 2.71828

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

$$(2.71828)' = \dots = \text{[top secret]} = \dots =$$

$$= 0$$

**2 step:** Finding a derivation of  $kek$

Never say it to girls:

$$(kek)' =$$

$$= 1$$

**3 step:** Finding a derivation of  $\frac{kek}{2.71828}$

It’s really easy to find:

$$(\frac{kek}{2.71828})' =$$

$$= \frac{2.71828}{7.38906}$$

**4 step:** Finding a derivation of  $\cos \frac{kek}{2.71828}$

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

$$(\cos \frac{kek}{2.71828})' = \dots = \text{[top secret]} = \dots =$$

$$= 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}$$

**5 step:** Finding a derivation of  $(\cos \frac{kek}{2.71828})^2$

Even my two-aged sister knows that:

$$((\cos \frac{kek}{2.71828})^2)' =$$

$$= 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}$$

**6 step:** Finding a derivation of 1

Only by using special skills we might know::

$$(1)' =$$

$$= 0$$

**7 step:** Finding a derivation of  $\frac{1}{(\cos \frac{kek}{2.71828})^2}$

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

$$(\frac{1}{(\cos \frac{kek}{2.71828})^2})' = \dots = \text{[top secret]} = \dots =$$

$$= \frac{(-1) \cdot 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}}{((\cos \frac{kek}{2.71828})^2)^2}$$

**8 step:** Finding a derivation of 0.367879

A true prince must know that:

$$(0.367879)' = \dots = \text{[top secret]} = \dots =$$

$$= 0$$

$$\text{9 step: Finding a derivation of } 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$$

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

$$\begin{aligned} (0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2})' &= \\ = 0.367879 \cdot \frac{(-1) \cdot 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}}{((\cos \frac{kek}{2.71828})^2)^2} \end{aligned}$$

$$\text{10 step: Finding a derivation of } a$$

Only by using special skills we might know::

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

$$= 1$$

$$\text{11 step: Finding a derivation of } kek$$

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

$$(kek)' =$$

$$= 1$$

$$\text{12 step: Finding a derivation of } \cos kek$$

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

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

$$= (-1) \cdot \sin kek$$

$$\text{13 step: Finding a derivation of } \cos kek \cdot a$$

My roommate mumbled it in his sleep all night:

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

$$= (-1) \cdot \sin kek \cdot a + \cos kek$$

$$\text{14 step: Finding a derivation of } x$$

A true prince must know that:

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

$$= 1$$

$$\text{15 step: Finding a derivation of } 2$$

A true prince must know that:

$$(2)' =$$

$$= 0$$

$$\text{16 step: Finding a derivation of } 2 \cdot x$$

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

$$(2 \cdot x)' =$$

$$= 2$$

$$\text{17 step: Finding a derivation of } 2 \cdot x \cdot \cos kek \cdot a$$

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

$$(2 \cdot x \cdot \cos kek \cdot a)' = \dots = \text{[top secret]} = \dots =$$

$$= 2 \cdot \cos kek \cdot a + ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot 2 \cdot x$$

$$\text{18 step: Finding a derivation of } x$$

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

$$(x)' =$$

$$= 1$$

$$\text{19 step: Finding a derivation of } x^2$$

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

$$(x^2)' = \dots = \text{[top secret]} = \dots =$$

$$= 2 \cdot x$$

$$\text{20 step: Finding a derivation of } kek$$

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

$$(kek)' =$$

$$= 1$$

$$\text{21 step: Finding a derivation of } \cos kek$$

A true prince must know that:

$$(\cos kek)' =$$

$$= (-1) \cdot \sin kek$$

$$\text{22 step: Finding a derivation of } a$$

My roommate mumbled it in his sleep all night:

$$\begin{aligned}(a)' &= \dots = \text{[top secret]} = \dots = \\ &= 1\end{aligned}$$

**23 step:** Finding a derivation of  $kek$

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

$$\begin{aligned}(kek)' &= \dots = \text{[top secret]} = \dots = \\ &= 1\end{aligned}$$

**24 step:** Finding a derivation of  $\sin kek$

It was a tragic moment when I learned it on matan exam:

$$\begin{aligned}(\sin kek)' &= \\ &= \cos kek\end{aligned}$$

**25 step:** Finding a derivation of  $-1$

Only by using special skills we might know::

$$\begin{aligned}(-1)' &= \dots = \text{[top secret]} = \dots = \\ &= 0\end{aligned}$$

**26 step:** Finding a derivation of  $(-1) \cdot \sin kek$

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

$$\begin{aligned}((-1) \cdot \sin kek)' &= \\ &= (-1) \cdot \cos kek\end{aligned}$$

**27 step:** Finding a derivation of  $(-1) \cdot \sin kek \cdot a$

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

$$\begin{aligned}((-1) \cdot \sin kek \cdot a)' &= \\ &= (-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek\end{aligned}$$

**28 step:** Finding a derivation of  $(-1) \cdot \sin kek \cdot a + \cos kek$

A true prince must know that:

$$\begin{aligned}((-1) \cdot \sin kek \cdot a + \cos kek)' &= \\ &= (-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek\end{aligned}$$

**29 step:** Finding a derivation of  $((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2$

Lol, i remember that:

$$\begin{aligned}((( -1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2)' &= \dots = \text{[top secret]} = \dots = \\ &= ((-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek) \cdot x^2 + 2 \cdot x \cdot ((-1) \cdot \sin kek \cdot a + \cos kek)\end{aligned}$$

**30 step:** Finding a derivation of  $((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a$

Lol, i remember that:

$$\begin{aligned}((( -1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a)' &= \\ &= ((-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek) \cdot x^2 + 2 \cdot x \cdot ((-1) \cdot \sin kek \cdot a + \cos kek) + 2 \cdot \cos kek \cdot a + ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot 2 \cdot x\end{aligned}$$

**31 step:** Finding a derivation of  $(((-1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$

Only after two cups of beer you might understand it:

$$\begin{aligned}(((( -1) \cdot \sin kek \cdot a + \cos kek) \cdot x^2 + 2 \cdot x \cdot \cos kek \cdot a) - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2})' &= \dots = \text{[top secret]} = \dots = \\ &= ((((-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek) \cdot x^2 + 2 \cdot x \cdot ((-1) \cdot \sin kek \cdot a + \cos kek) + 2 \cdot \cos kek \cdot a + ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot 2 \cdot x) - 0.367879 \cdot \frac{(-1) \cdot 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}}{((\cos \frac{kek}{2.71828})^2)^2}\end{aligned}$$

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

$$((( (-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek) \cdot x^2 + 2 \cdot x \cdot ((-1) \cdot \sin kek \cdot a + \cos kek) + 2 \cdot \cos kek \cdot a + ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot 2 \cdot x) - 0.367879 \cdot \frac{(-1) \cdot 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}}{((\cos \frac{kek}{2.71828})^2)^2}$$

**Finally... The 2 derivation of the expression:**

$$f^{(2)}(\text{kek}, \text{a}, \text{x}) = ((((-1) \cdot \cos kek \cdot a + (-1) \cdot \sin kek + (-1) \cdot \sin kek) \cdot x^2 + 2 \cdot x \cdot ((-1) \cdot \sin kek \cdot a + \cos kek) + 2 \cdot \cos kek \cdot a + ((-1) \cdot \sin kek \cdot a + \cos kek) \cdot 2 \cdot x) - 0.367879 \cdot \frac{(-1) \cdot 2 \cdot \cos \frac{kek}{2.71828} \cdot 0.367879 \cdot (-1) \cdot \sin \frac{kek}{2.71828}}{((\cos \frac{kek}{2.71828})^2)^2}$$

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

In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it's value = 788.00817**

**- Finding partical derivations**

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

$$\frac{\partial f}{\partial kek} = 3.1415 \cdot (-1) \cdot \sin kek - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2}$$

In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it's value = -76.42637 !!!**

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

$$\frac{\partial f}{\partial a} = 0.907447$$

In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it's value = 0.90745 !!!**

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

$$\frac{\partial f}{\partial x} = 2.85074 \cdot 2 \cdot x$$

In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it's value = 5.70149 !!!**

- Finding full derivation

Full derivation:

$$\sqrt{(3.1415 \cdot (-1) \cdot \sin kek - 0.367879 \cdot \frac{1}{(\cos \frac{kek}{2.71828})^2})^2 + 0.82346 + (2.85074 \cdot 2 \cdot x)^2}$$

In the point  $M_0(kek_0, a_0, x_0) = (13.000, 3.142, 1.000)$  **it's value = 76.64411 !!!**

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 kek:

f(kek) = 3.1415 · cos kek − tan  $\frac{kek}{2.71828}$

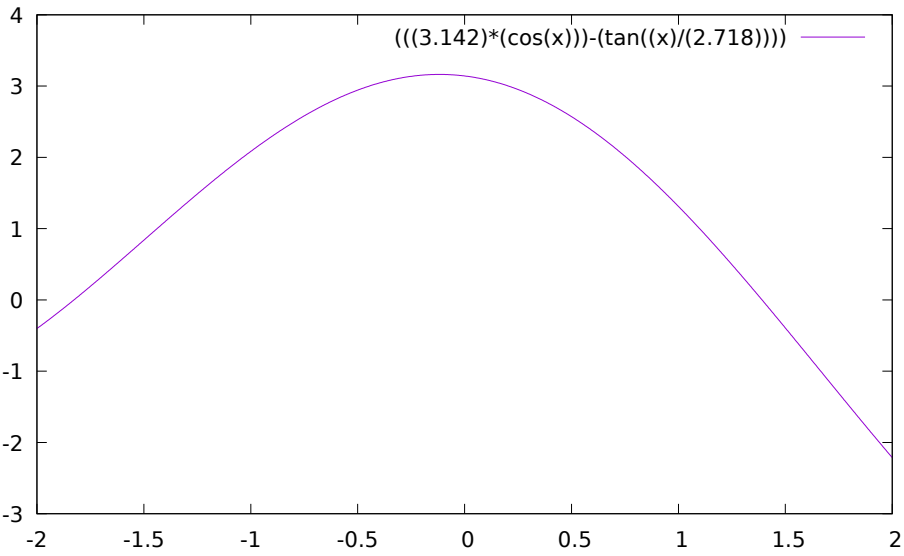
- Decomposing on Macloren's formula

First 4 members of Maklorems decomposition for  $kek \rightarrow kek_0 = 13.000$ :

f(kek) = 17.1042 + (−76.4264) · (kek − 13) + 392.399 · (kek − 13)<sup>2</sup> + (−2068.2) · (kek − 13)<sup>3</sup> + 10863.7 · (kek − 13)<sup>4</sup>+o((kek − 13)<sup>4</sup>)

- Graphics

Graph of f(kek) = 3.1415 · cos kek − tan  $\frac{kek}{2.71828}$  on the diapasone  $kek \in [-2 : 2]$  :



- Equations in the point

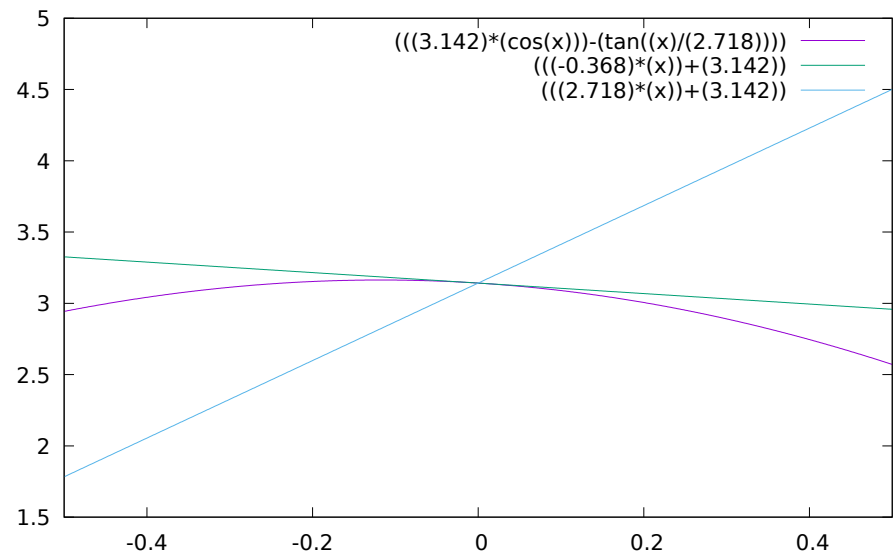
Tangent equation in  $kek_0 = 0.000$ :

f(kek) = (−0.367879) · kek + 3.1415

Normal equation in  $kek_0 = 0.00000$ :

f(kek) = 2.71828 · kek + 3.1415

Their graphs in  $\delta = 0.500$  coverage of the point  $kek_0 = 0.000$ :



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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