MIPT 2020 presents

«Bad mathematitian taking deprivatives»

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Introduction

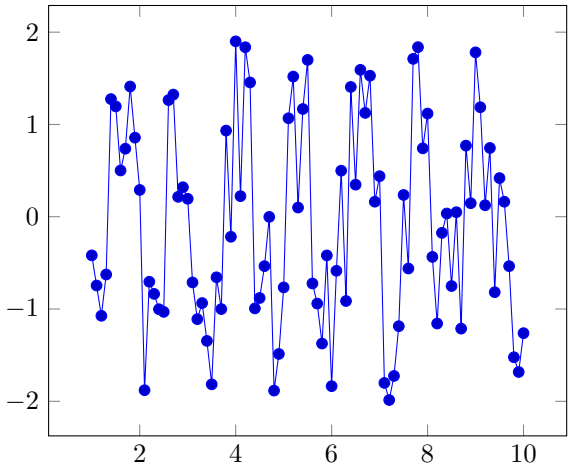
My name is Anna Savchuk and in this paper I will present to caring reader the process of artificial intelligence training to calculate deprivatives. The problems of calculating difficult expression is widely spread specially among ~~us~~ first year students, so as their representative I decided to make a program that will be able to differentiate and easily simplify mathematical expressions.

Differentiating complex expressions I reffer to MIPT lections and textbooks but nothing can save me from making mistakes so I must apologize for making some simple calculations. In my defense I can say that they train attention and write derivatives of simple functions into the subconscious. In my work I'll break down a big expression, simplify it, take a derivative and look at it. This process can go on endlessly, but even this is a great success for me.

We are going to work with this expression, but before we'll simplify it:

$$sin\,(5 \cdot x) + cosx^5$$

So it looks like this:



Let's find deprivative for this expression:

$$sin\,(5 \cdot x) + cosx^5$$

The show must go on

$$(sin\,(5 \cdot x))'$$

We pretend that we can calculate derivatives:

$$(5 \cdot x)'$$

We pretend that we can calculate derivatives:

$$5'$$

Just do it!

$$x'$$

It may look strange but I hope that's right

$$0 \cdot x + 1 \cdot 5$$

It may look strange but I hope that's right

$$(0 \cdot x + 1 \cdot 5) \cdot cos\,(5 \cdot x)$$

We pretend that we can calculate derivatives:

$$\left(cosx^5\right)'$$

We pretend that we can calculate derivatives:

$$\left(x^5\right)'$$

It may look strange but I hope that's right

$$5'$$

We pretend that we can calculate derivatives:

$$x'$$

mATAN is my whole life!

$$0 \cdot logx + \frac{1}{x} \cdot 5$$

mATAN is my whole life!

$$\left(0 \cdot logx + \frac{1}{x} \cdot 5\right) \cdot (-1) \cdot sinx^5$$

So, I'll try to simplify it, let's believe in my success

$$(0 \cdot x + 1 \cdot 5) \cdot cos\,(5 \cdot x) + \left(0 \cdot logx + \frac{1}{x} \cdot 5\right) \cdot (-1) \cdot sinx^5$$

With this program you don't need to be a genius to calculate the speed of me going mad

$$(0 \cdot x + 5) \cdot cos\,(5 \cdot x) + \left(0 \cdot logx + \frac{1}{x} \cdot 5\right) \cdot (-1) \cdot sinx^5$$

We pretend that we can calculate derivatives:

$$(0 + 5) \cdot cos\,(5 \cdot x) + A,$$

where

$$A = \left(0 + \frac{1}{x} \cdot 5\right) \cdot (-1) \cdot sinx^5$$

The show must go on

$$5 \cdot cos\,(5 \cdot x) + A,$$

where

$$A = \left(0 + \frac{1}{x} \cdot 5\right) \cdot (-1) \cdot sinx^5$$

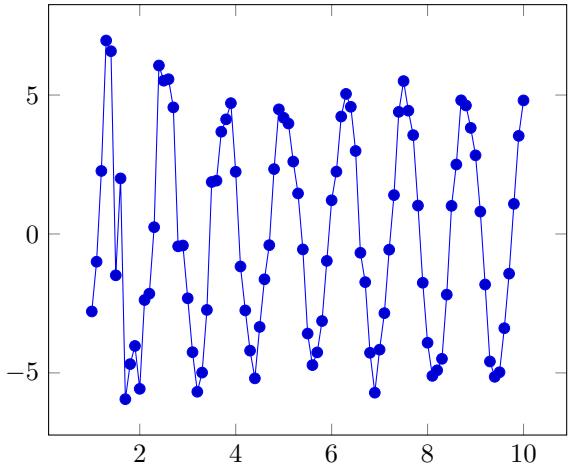
The show must go on

$$5 \cdot cos\,(5 \cdot x) + \frac{1}{x} \cdot 5 \cdot (-1) \cdot sinx^5$$

Final deprivative is:

$$5 \cdot cos\,(5 \cdot x) + \frac{1}{x} \cdot 5 \cdot (-1) \cdot sinx^5$$

Let's see how does it look like:



My references:

- Field for experiments
  https://github.com/s-a-v-a-n-n-a/Differentiator
- Lections by Redkozubov V.V.
  https://www.youtube.com/playlist?list=PLthfp5exSWEoItZUXCG3Bhrn3AFzw8AKK