Autodiff

Exercise

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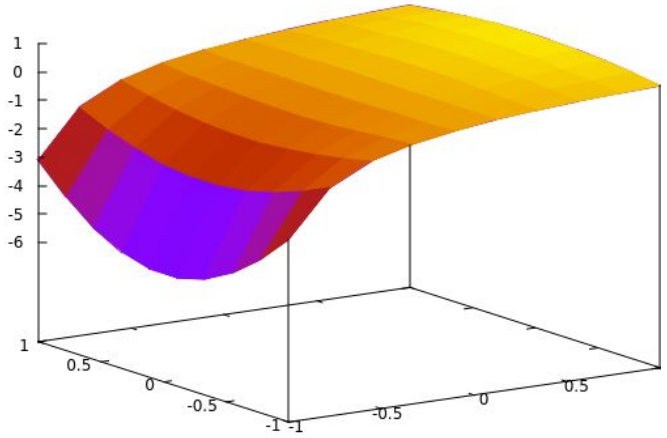
Our Function

$$f(x,y) = \frac{\sin x \ \cos y}{\ln(2+\sin x)}$$



Parsing Tree

$$f(x,y) = \frac{\sin x \ \cos y}{\ln(2+\sin x)}$$

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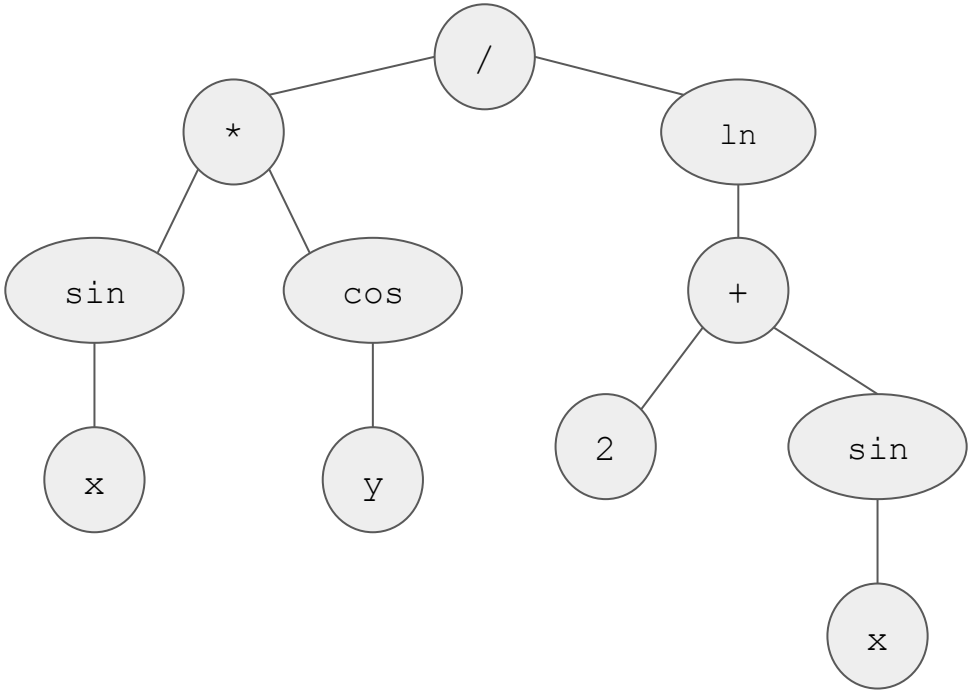

Implementation

Using our library `ad.h` write an executable `ad_test.cpp` that computes all values and derivatives of the function in range `x=[-1:1]`, `y=[-1:1]` with step size `0.1` wrt `x`, `y`

$$f(x,y) = \frac{\sin x \, \cos y}{\ln(2+\sin x)}$$

Remember

- when deriving wrt `x` -> `y` is constant (`y.derivative=0`)
- when deriving wrt `y` -> `x` is constant (`x.derivative=0`)

Setup

1. start by creating a folder that will contain the relevant source code (namely only `ad.h`)
2. create a file called `ad_test.cpp` with a `main()`, that will contain the solution of the exercise
3. *hint*: to set up the build system, you can start by copying `ad_test.cpp` from last class source code
4. write the `CMakeLists.txt` on the top level folder
5. as always isolate your build `mkdir build && cd build` and build :) `cmake .. && make`
6. Once you have this ready you can start editing `ad_test.cpp` and completing this exercise