

Tartalomjegyzék

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numpy Homework

numpy

Implement the following python functions. The name of the exercise should be the name of the function. You will need `import numpy`! On your own computer I recommend Anaconda because it is installed with numpy by default. Mind that you need the 2.7 version. Or you can use the `leibniz`.

integral (2p)

The function should have 3 parameters, two real numbers and one integer:

```
a: the left-hand-side of the interval
b: the right-hand-side of the interval
n: the number of equally spaced points in the partition, including a and b
```

$a < b$ and $n > 1$.

The output should be a real number: the integral of the function $\sin(x) / x$ on the interval $[a,b]$ calculated with the trapezoidal rule.

derivative (3p)

The function should have 3 parameters, two real numbers and one integer:

```
a: the left-hand-side of the interval
b: the right-hand-side of the interval
n: the number of uniformly distributed points in the interval
```

$a < b$ and $n > 1$.

- The output should be a numpy vector of length $n-1$ containing the numerical derivative of the function $\sin(x) / x$ on the given interval using the random partition.
- The partition should contain $n-2$ uniformly distributed point in $[a,b]$ plus $x_0 = a, x_{n-1} = b$.
 - ◆ You can make this partition by making $n-2$ random points, sort them then add a to the front and b to the end.
 - ◆ you might want to use: `numpy.sort` and `numpy.random.rand`

Remember the (forward) finite difference:

$$\Delta f_i = \frac{f(x_{i+1}) - f(x_i)}{x_{i+1} - x_i}$$

Handing-in

Send the exercises as a python code from your math email account to **info1hazi@gmail.com**

You should attach one python file containing the definition of the required functions without any test code or `print` command.

The file should be named:

```
EN1_HF8_<user account>.py
```

the subject of the letter should be the same (without the extension). For me example:

```
EN1_HF8_borbely.py
```

Deadline

20th of May, 29:59