python数学实验与建模_Python数学

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In this tutorial, we will learn about Python Math module and its functions. In the previous tutorial, we learned about Python Matrix.

在本教程中，我们将学习Python Math模块及其功能。 在上一教程中，我们了解了Python Matrix 。

Python数学 (Python Math)

Python Math module provides access to the mathematical functions defined by the C standard. So, we can do many complex mathematical operations with the help of the Python Math functions. The tutorial is designed with some basic functions and examples of math module. Let's get started.

Python Math模块提供对C标准定义的数学函数的访问。 因此，我们可以借助Python Math函数执行许多复杂的数学运算。 本教程设计了一些基本功能和数学模块示例。 让我们开始吧。

Python数学函数– floor（），ceil（），fabs（x） (Python Math Functions – floor(), ceil(), fabs(x))

Python math module is part of the python installation, so we can just import it in our python program and use it.

Python数学模块是python安装的一部分，因此我们可以将其导入到python程序中并使用它。

In this section, we will discuss about these three math module functions. The `floor()` function is used to get the floor value to the given number. Similarly `ceil()` function is used to get the ceiling value of a given number. So, these two functions are used to round the value, either floor value or ceiling value.

在本节中，我们将讨论这三个数学模块功能。 `floor()`函数用于将底值设为给定的数字。 同样， `ceil()`函数用于获取给定数字的上限。 因此，这两个函数用于舍入底值或上限值。

`fabs()` function is used to get the absolute value of the given number. See the example code below.

`fabs()`函数用于获取给定数字的绝对值。 请参见下面的示例代码。

```python
import math

number = -2.34

print('The given number is :', number)
print('Floor value is :', math.floor(number))
print('Ceiling value is :', math.ceil(number))
print('Absolute value is :', math.fabs(number))
```

And the output will be

输出将是

```
The given number is : -2.34
Floor value is : -3
Ceiling value is : -2
Absolute value is : 2.34
```

Python数学exp（），expm1（）和log（） (Python Math exp(), expm1() and log())

Math module `exp()` function is used to get **e^x**.

数学模块`exp()`函数用于获取**e ^ x** 。

`expm1()` function returns **(e^x)-1**. For small value of x, direct calculation of `exp(x)-1` may results in significant loss in precision while the `expm1(x)` can produce output in full precision.

`expm1()`函数返回（**e ^ x）-1** 。 对于较小的x值，直接计算`exp(x)-1`可能会导致精度显着降低，而`expm1(x)`可能会产生完全精度的输出。

The `log()` function is used to get the log value. See the example code.

`log()`函数用于获取日志值。 请参阅示例代码。

```
import math

number = 1e-4  # small value of of x

print('The given number (x) is :', number)
print('e^x (using exp() function) is :', math.exp(number)-1)
print('e^x (using expml() function) is :', math.expm1(number))
print('log(fabs(x), base) is :', math.log(math.fabs(number), 10))
```

And you will get the output like this

这样您将获得输出

```
The given number (x) is : 0.0001
e^x (using exp() function) is : 0.0001000050001667141
e^x (using expml() function) is : 0.00010000500016667084
log(fabs(x), base) is : -3.999999999999999
```

Python数学三角函数 (Python Math Trigonometric Functions)

All the trigonometric functions are available in python math module, so you can easily calculate them using **sin()**, **cos()**, **tan()**, **acos()**, **asin()**, **atan()** etc functions.

python数学模块中提供了所有三角函数，因此您可以使用**sin（）， cos（）， tan（）， acos（）， asin（）， atan（）**等函数轻松地计算它们。

Also you can convert angles from degree to radian and radian to degree. See the example code.

您还可以将角度从度转换为弧度，并将弧度转换为度。 请参阅示例代码。

```
import math

angleInDegree = 45
angleInRadian = math.radians(angleInDegree)

print('The given angle is :', angleInRadian)
print('sin(x) is :', math.sin(angleInRadian))
print('cos(x) is :', math.cos(angleInRadian))
print('tan(x) is :', math.tan(angleInRadian))
```

So, in output you will get

因此，在输出中，您将获得

Python数学sqrt (Python Math sqrt)

We can use `sqrt(x)` function to get the square root of x. Below is a simple example of python math sqrt function.

我们可以使用`sqrt(x)`函数获得x的平方根。 以下是python math sqrt函数的简单示例。

```
import math

x = 16
y = 10
z = 11.2225

print('sqrt of 16 is ', math.sqrt(x))
print('sqrt of 10 is ', math.sqrt(y))
print('sqrt of 11.2225 is ', math.sqrt(z))
```

Output produced by above math sqrt example is:

上面的数学sqrt示例产生的输出是：

```
sqrt of 16 is  4.0
sqrt of 10 is  3.1622776601683795
sqrt of 11.2225 is  3.35
```

Python数学PI (Python Math PI)

Python math module has "pi" as a constant that can be used in mathematical calculations such as area of a circle.

Python数学模块具有" pi"作为常量，可用于数学计算（例如圆的面积）。

```
import math

print('PI value = ', math.pi)

radius = 4

print('Area of Circle with Radius 4 =', math.pi * (radius ** 2))
```

Above python example program will produce following output.

上面的python示例程序将产生以下输出。

```
PI value =  3.141592653589793
Area of Circle with Radius 4 = 50.26548245743669
```

These are some of the basic functions from Python Math module. If you want to know about more functions, then see the official documentation.

这些是Python Math模块的一些基本功能。 如果您想了解更多功能，请参阅官方文档 。

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