
physics Documentation

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pyTeens

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1.1 physics package

1.1.1 Submodules

1.1.2 physics.errors module

physics.errors

It contains the Errors class.

It could be used to do arithmetic operations using numbers and their errors on themselves.

class `physics.errors.Errors` (*float number, **settings*)

Bases: `object`

The Errors class is used to define a number with an absolute, relative or percentage error and do arithmetic operations with them.

__abs__

That function is used to return the absolute value of the chosen number.

__add__

That function is used to establish the result of an Addition, summing absolute errors and numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to add.

__eq__

That function is used to compare two numbers using “==”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

__float__

That function is used to return the float of the chosen number.

`__floordiv__`

That function is used to establish the result of a Floor Division, summing relative errors and dividing numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to divide.

`__ge__`

That function is used to compare two numbers using “>=”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

`__gt__`

That function is used to compare two numbers using “>”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

`__iadd__`

That function is used to establish the result of an Inline Addition, summing absolute errors and numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to add.

`__ifloordiv__`

That function is used to establish the result of an Inline Floor Division, summing relative errors and dividing numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to divide.

`__imod__`

That function is used to establish the result of an Inline Modulo, summing relative errors and giving the remainder of the divided numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to get the modulo.

`__imul__`

That function is used to establish the result of an Inline Multiplication, summing relative errors and multiplying numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to multiply.

`__init__`

It initializes the object, checks if an absolute, relative or percentage is given and if not it generates an absolute error following the established rules during physics conventions.

Parameters

- **number** (*float or integer*) – The number you’ve chosen
- ****settings** (*dict*) – A dictionary of errors. It must include an absolute, relative or percentual error at all.

`__int__`

That function is used to return the integer of the chosen number.

`__ipow__`

That function is used to establish the result of an Inline Exponentiation, multiplying the first relative error for the second number and giving arithmetic power.

Parameters `second_number` (*integer, float or Errors*) – The number you want to get the power.

`__isub__`

That function is used to establish the result of an Inline Subtraction, summing absolute Errors and subtracting numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to substrate.

`__itruediv__`

That function is used to establish the result of an Inline True Division, summing relative errors and dividing numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to divide.

`__le__`

That function is used to compare two numbers using “<=”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

`__len__`

That function is used to return the number of digits of the chosen number.

`__lt__`

That function is used to compare two numbers using “<”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

`__mod__`

That function is used to establish the result of a Modulo, summing relative errors and giving the remainder of the divided numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to get the modulo.

`__mul__`

That function is used to establish the result of a Multiplication, summing relative errors and multiplying numbers.

Parameters `second_number` (*integer, float or Errors*) – The number you want to multiply.

`__ne__`

That function is used to compare two numbers using “!=”.

Parameters `second_number` (*integer, float or Errors*) – The number you want to compare.

`__neg__`

That function is used to return the negative value of the chosen number.

`__new__()`

Create and return a new object. See `help(type)` for accurate signature.

`__pos__`

That function is used to return the positive value of the chosen number.

__pow__

That function is used to establish the result of an Exponentiation, multiplying the first relative error for the second number and giving arithmetic power.

Parameters **second_number** (*integer, float or Errors*) – The number you want to get the power.

__pyx_vtable__ = <capsule object NULL>

__radd__

Return value+self.

__reduce__ ()

Errors.__reduce_cython__(self)

__repr__

Returns the representation of the object.

Returns The Representation

Return type str

__rfloordiv__

Return value//self.

__rmod__

Return value%self.

__rmul__

Return value*self.

__rpow__

Return pow(value, self, mod).

__rsub__

Return value-self.

__rtruediv__

Return value/self.

__setstate__ ()

Errors.__setstate_cython__(self, __pyx_state)

__str__

That function is used to return a string representation of the chosen number.

__sub__

That function is used to establish the result of a Subtraction, summing absolute Errors and subtracting numbers.

Parameters **second_number** (*integer, float or Errors*) – The number you want to substrate.

__truediv__

That function is used to establish the result of a True Division, summing relative errors and dividing numbers.

Parameters **second_number** (*integer, float or Errors*) – The number you want to divide.

absolute_error

number

percentage_error

`relative_error`

1.1.3 physics.gravity module

physics.gravity

It contains the Gravity class.

It could be used to get the gravity force of some objects.

`physics.gravity.calculate_gravity` (*float mass*, *float second_mass=Earth*, *float distance=EarthRadius*) → *float*

Given two masses and their distance, it calculates the Gravity force between them.

Parameters

- **mass** (*float*) – The first mass.
- **second_mass** (*float*) – The second mass. By default, the earth mass is used.
- **distance** (*float*) – The distance between the two masses. By the default, the radius of the earth is used.

Returns The gravity force.

Return type *float*

1.1.4 physics.numbers module

physics.numbers

It contains the Numbers class.

It could be used to define numbers using significant digits.

class `physics.numbers.Numbers` (*float number*)

Bases: `object`

`__abs__`

That function is used to obtain the absolute value of the number.

Returns The Absolute Value.

Return type *int* or *float*

`__add__`

That function is used to establish the result of an Addition, using significant digits.

Parameters **other_number** (*integer*, *float* or *Numbers*) – The number you want to add.

Returns The result

Return type *Integer*, *float* or *Numbers*

`__eq__`

That function is used to compare two numbers using “==”.

Parameters **other_number** (*integer*, *float* or *Numbers*) – The number you want to compare.

`__float__`

That function is used to return the float of the chosen number.

Returns The Float.

Return type float

`__floordiv__`

That function is used to establish the result of a Floor Division, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to divide.

Returns The result

Return type Integer, float or *Numbers*

`__ge__`

That function is used to compare two numbers using “>=”.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to compare.

`__gt__`

That function is used to compare two numbers using “>”.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to compare.

`__iadd__`

That function is used to establish the result of an Inline Addition, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to add.

Returns The result

Return type Integer, float or *Numbers*

`__ifloordiv__`

That function is used to establish the result of an Inline Floor Division, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to divide.

Returns The result

Return type Integer, float or *Numbers*

`__imul__`

That function is used to establish the result of an Inline Multiplication, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to multiply.

Returns The result

Return type Integer, float or *Numbers*

`__init__`

It initializes the object and get the significant digits following the established rules during physics conventions.

Parameters `number` (*int or float*) – The number you’ve chosen.

__int__

That function is used to return the integer of the chosen number.

Returns The integer of the number.

Return type int

__invert__

That function is used to return the inverted value of the chosen number.

Returns The Inverted Value.

Return type int or float

__isub__

That function is used to establish the result of an Inline Subtraction, using significant digits.

Parameters **other_number** (*integer, float or Numbers*) – The number you want to subtract.

Returns The result

Return type Integer, float or *Numbers*

__itruediv__

That function is used to establish the result of an Inline True Division, using significant digits.

Parameters **other_number** (*integer, float or Numbers*) – The number you want to divide.

Returns The result

Return type Integer, float or *Numbers*

__le__

That function is used to compare two numbers using “<=”.

Parameters **other_number** (*integer, float or Numbers*) – The number you want to compare.

__len__

That function is used to return the number of digits of the chosen number.

Returns The length.

Return type Integer

__lt__

That function is used to compare two numbers using “<”.

Parameters **other_number** (*integer, float or Numbers*) – The number you want to compare.

__mul__

That function is used to establish the result of a Multiplication, using significant digits.

Parameters **other_number** (*integer, float or Numbers*) – The number you want to multiply.

Returns The result

Return type Integer, float or *Numbers*

__ne__

That function is used to compare two numbers using “!=”.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to compare.

__neg__

That function is used to return the negative value of the chosen number.

Returns The Negative Value.

Return type int or float

__new__ ()

Create and return a new object. See help(type) for accurate signature.

__pos__

That function is used to return the positive value of the chosen number.

Returns The Positive Value.

Return type int or float

__radd__

Return value+self.

__reduce__ ()

Numbers.__reduce_cython__(self)

__repr__

That function is used to return the representation of the object

Returns The representation

Return type str

__rfloordiv__

Return value//self.

__rmul__

Return value*self.

__round__ (self, digits=0) → float

That function is used to round the chosen number.

Returns The Rounded Value.

Return type float

__rsub__

Return value-self.

__rtruediv__

Return value/self.

__setstate__ ()

Numbers.__setstate_cython__(self, __pyx_state)

__str__

That function is used to return a string representation of the chosen number.

Returns The String.

Return type str

__sub__

That function is used to establish the result of a Subtraction, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to subtract.

Returns The result

Return type Integer, float or *Numbers*

`__truediv__`

That function is used to establish the result of a True Division, using significant digits.

Parameters `other_number` (*integer, float or Numbers*) – The number you want to divide.

Returns The result

Return type Integer, float or *Numbers*

`after_comma`

`number`

`significant_digits`

1.1.5 physics.proportionality module

physics.proportionality

It contains the Proportionality class.

It could be used to define a proportionality relation between numbers.

exception `physics.proportionality.LessThanTwoNumbersError`

Bases: `Exception`

This exception is called when number of parameters are less than 2. 0 is not counted.

`__init__`

Initialize self. See `help(type(self))` for accurate signature.

`__new__()`

Create and return a new object. See `help(type)` for accurate signature.

`__reduce_cython__` (*self*)

`__setstate_cython__` (*self, __pyx_state*)

exception `physics.proportionality.MissingNeededParameters`

Bases: `Exception`

This exception is called when constant and proportionality aren't in the parameters and numbers is missing.

`__init__`

Initialize self. See `help(type(self))` for accurate signature.

`__new__()`

Create and return a new object. See `help(type)` for accurate signature.

`__reduce_cython__` (*self*)

`__setstate_cython__` (*self, __pyx_state*)

exception `physics.proportionality.NoRelationError`

Bases: `Exception`

This exception is called when there's no relation.

__init__

Initialize self. See help(type(self)) for accurate signature.

__new__ ()

Create and return a new object. See help(type) for accurate signature.

__reduce_cython__ (self)

__setstate_cython__ (self, __pyx_state)

class physics.proportionality.**Proportionality** (**options)

Bases: object

The proportionality class is used to calculate and use proportionality using numbers. percentage error and do arithmetic

__init__

It initializes the object and it checks options parameter (kwargs), and then get the constant of the proportionality.

Raises

- **MissingNeededParameters** – It throws an exception if some parameters are missing.
- **NoRelationError** – It throws an exception if there are no relations between numbers.
- **LessThanTwoNumbersError** – It throws an exception if there are less numbers than 2.

__new__ ()

Create and return a new object. See help(type) for accurate signature.

__pyx_vtable__ = <capsule object NULL>

__reduce__ ()

Proportionality.__reduce_cython__(self)

__repr__

Return the representation of the object.

Returns The representation

Return type str

__setstate__ ()

Proportionality.__setstate_cython__(self, __pyx_state)

__str__

Return the relation and the constant.

Returns The relation and its constant.

Return type str

calculate (self, float x) → float

Calculate the y using the formula created during proportionality check.

Parameters **x** (float) – The number you want to calculate.

constant

constant_formulas = {'direct': <cyfunction Proportionality.<lambda>>, 'inverse': <cy

formula

relation

1.1.6 Module contents

CHAPTER 2

Changelog

physics *Version: 2.0.1*

- Fix bugs

Main Contributors:

- Gabriel Hearot <gabriel@hearot.it>

CHAPTER 3

Welcome to physics!

physics is a simple **Educational library** written in **Python**. It could be used for your **school projects**.

Have you ever tried to define a number using errors? Calculating gravity? Get a proportionality relation? Now, that's possible and **simple**.

- *Installation*
 - *Installation from pypi* (using **pip**) - Latest stable version
 - *From Github*
 - * *Using pip*
 - * *Downloading files*
 - *Documentation*
- *Files*
- *How to contribute*

4.1 Installation

4.2 From PyPi

Just use **pip**:

```
pip install physics
```

Or if you want to *upgrade* the package:

```
pip install --upgrade physics
```

4.3 From Github

4.3.1 Using Pip

Try using that piece of code:

```
pip install git+https://github.com/pyTeens/physics.git
```

Or if you want to *upgrade* the package

```
pip install --upgrade git+https://github.com/pyTeens/physics.git
```

4.3.2 Downloading files

In primis (from Latin, “firstable”), **clone** the repository:

```
git clone https://github.com/pyTeens/physics.git
```

Then, change directory:

```
cd physics
```

And finally, install the **package**:

```
sudo python3 setup.py install
```

4.4 Files

You’ll find lots of *not understandable* **directory** and **files**, so here a list and definitions of them:

- **physics** - *Main directory*
 - **physics/__init__.pyx** - *Init file, it included all classes*
 - **physics/errors.pyx** - *Errors class*
 - **physics/gravity.pyx** - *Gravity class*
 - **physics/numbers.pyx** - *Numbers class*
 - **physics/proportionality.pyx** - *Proportionality class*

4.5 How to contribute

In primis (“firstable”), you **must** read the [code of conducts](#) and the [contributing document](#), then ask [hearot](#) to enter the **organization** (pyTeens).

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CHAPTER 5

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