

Integral Calculus and Differential Equations with Python

The art of doing mathematics
is finding that special case that
contains all the germs of
generality.

- David Hilbert

Data Types

- Integer: 10, 15, 100
- Floating Point Numbers: 10.5, 20.05
- String: "Hello Universe"
- *type()* function

Variable Naming

- Variable with Space
- Variable starts with Number
- Special words of Python

Converting Data Types

- Convert with *int()*
- Convert with *float()*
- Convert with *str()*

String Manipulation

- Double quote vs Single code
- String Length
- Indexing and Slicing
- Concatenate string
- String Methods(upper, lower, startswith, join)

Boolean Values

True

False

if-else Statement

***if* condition:**

Execute this block of code if the condition is true

else:

Execute is the condition is false

if-else Statement

if condition:

Execute this block of code if the condition is true

elif condition:

Execute this block of code if the condition is true

else:

Execute if the condition is false

while loop

***while* condition:**

Execute this block of code if the condition is true

continue and *break*

while True:

continue

break

for loop

for item *in* iterable:

Execute this block of code

Using *enumerate*

```
for index, item in enumerate(iterable):  
    # Execute this block of code
```

Importing *module*

- *import* module_name
- **from** module_name *import* attribute_name
- *import* module_name *as* alias_name
- *from* module_name *import* *

Function

```
def function_name(parameters):  
    # code block of the function  
    return value
```

List

- Creating list: num=[1,5,5,10]
- Accessing elements
- Modifying elements
- List Methods(append, remove, insert, sort)

Tuple

- Creating tuple: tuple=(1,5,5,10)
- Packing and Unpacking
- Concatenate, Repeat and Slice
- Immutability, counting and indexing

Sets

- Creating set: $\text{Set_A}=\{1,2,3\}$
- Adding element
- Removing element
- *Set operations*

Dictionaries

```
dic_name={  
    key1: value1,  
    key2: value2,  
    key3: value3,  
    ...  
}
```

Error Handling

```
try::  
    # Code block)  
except error_name(optional):  
    # Code block
```

Introduction to Numpy Module

- Importing Numpy
- Creating a numpy array
- Indexing and slicing
- Mathematical Operations on Numpy array
- Array Manipulation

Thank you