WIGGLES

EXPERIMENT #02

AUGUST 2022

EXPERIMENT NAME

Generation of two base signals using user defined functions.

1. UNIT IMPULSE WITH FUNCTION

Theory

1. An ideal **impulse signal** is a signal that is **zero everywhere** *but* at the **origin (t = 0)**, it is infinitely high.
2. Although, the area of the impulse is finite. The unit impulse signal is the most widely used standard signal used in the analysis of signals and systems.

Expression

$$\delta(t) = \{1 \, for \, t = 0 \; else \; 0\}$$

Getting the environment ready

- **Python 3.10** is installed in the system and added to the system variables.
- The library is installed through pip i.e. through the command **“pip install wiggles.”**
- Here, **vs code** is used to code and test out the results.
- The code is written to best find the solution of the given problem and then is evaluated and displayed using the inbuilt **‘show()’** or the **‘compare()’** function in wiggles.

PROBLEM

- Generate **unit impulse signals** using user defined functions in python and plot them using the same.

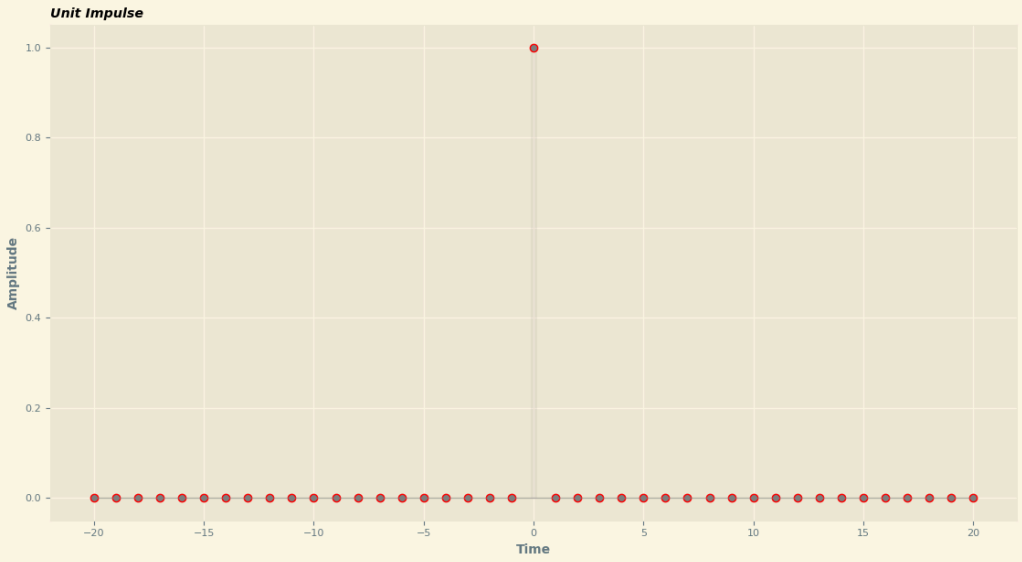
PROGRAM CODE

```
from wiggles import signals as sp

#making signal using the abstracted user defined function
unitimpulse=sp.unit_impulse(-20,20)
unitimpulse.name="Unit Impulse"
unitimpulse.show()
```

OUTPUT

Plotted graph for unit impulse signal



Unit impulse plotted in the discrete time domain using user defined function. Represented through a stem graph.

2. UNIT STEP WITH FUNCTION

Theory

1. The **step signal** or **step function** is that type of standard signal which exists only for positive time and it is zero for negative time. In other words, a signal **x(t)** is said to be a step signal if and only if it exists **for t > 0** and **zero for t < 0.** The step signal is an important signal used for analysis of many systems.
2. The **step signal** is equivalent to applying a signal to a system whose magnitude suddenly changes and remains constant forever after application. If we want to obtain a signal which starts at **t = 0**, so that it may have a value of **zero for t < 0**, then we only need to multiply the given signal with the unit step signal **u(t).**

Expression

$$u(t) = \{1\, for\, t \geq 0 \quad 0\ for\ t < 0\}$$

Getting the environment ready

- **Python 3.10** is installed in the system and added to the system variables.
- The library is installed through pip i.e. through the command **“pip install wiggles.”**
- Here, **vs code** is used to code and test out the results.
- The code is written to best find the solution of the given problem and then is evaluated and displayed using the inbuilt **‘show()’** or the **‘compare()’** function in wiggles.

PROBLEM

- Generate **unit step signals** in python using user defined functions
- Plot and display the signal.

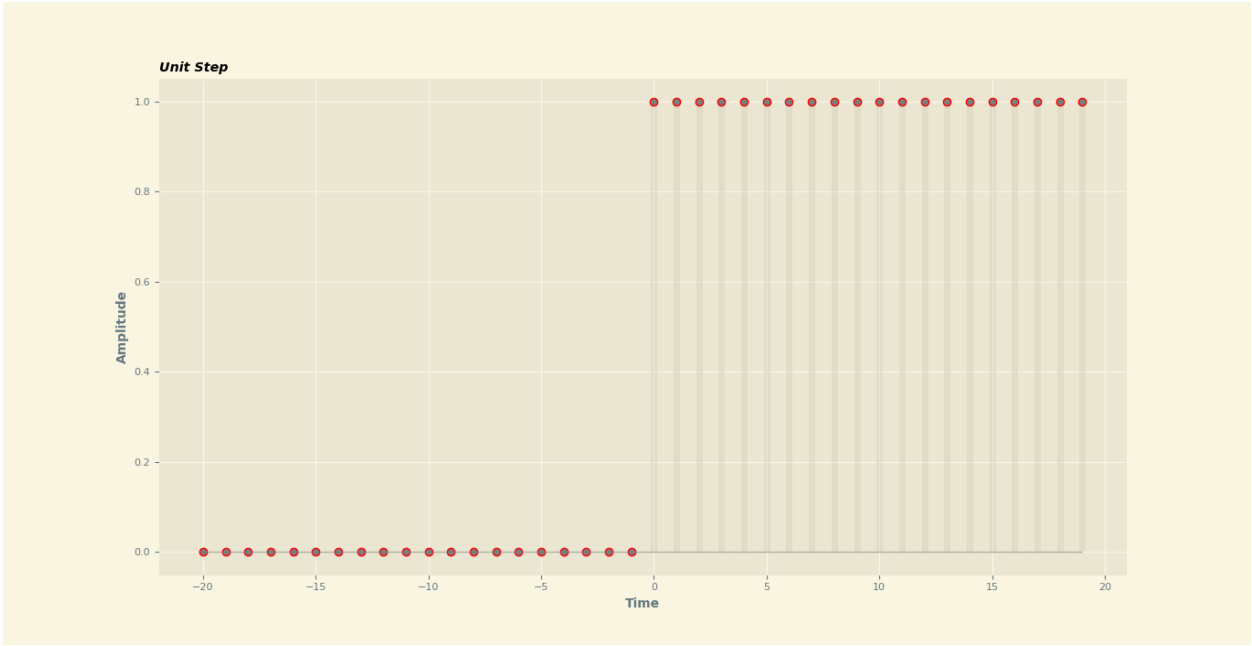
PROGRAM CODE

```
#from wiggles import signals as sp

#making signal using the inbuilt function we developed in wiggles and displaying it
unitimpulse=sp.unit_step(-20,20)
unitimpulse.name="Unit Stepe"
unitimpulse.show()
```

OUTPUT

Plotted graph for unit step signal



Unit step plotted in the discrete time domain using user defined functions. Represented through a stem graph.

CONCLUSION

The above experiments show us how to create two base signals, i.e. unit step and unit impulse using the abstracted user defined function and how to display, plot and subplot the same.