LaserNumpy

September 2, 2017

1 Numpy with Lasers.

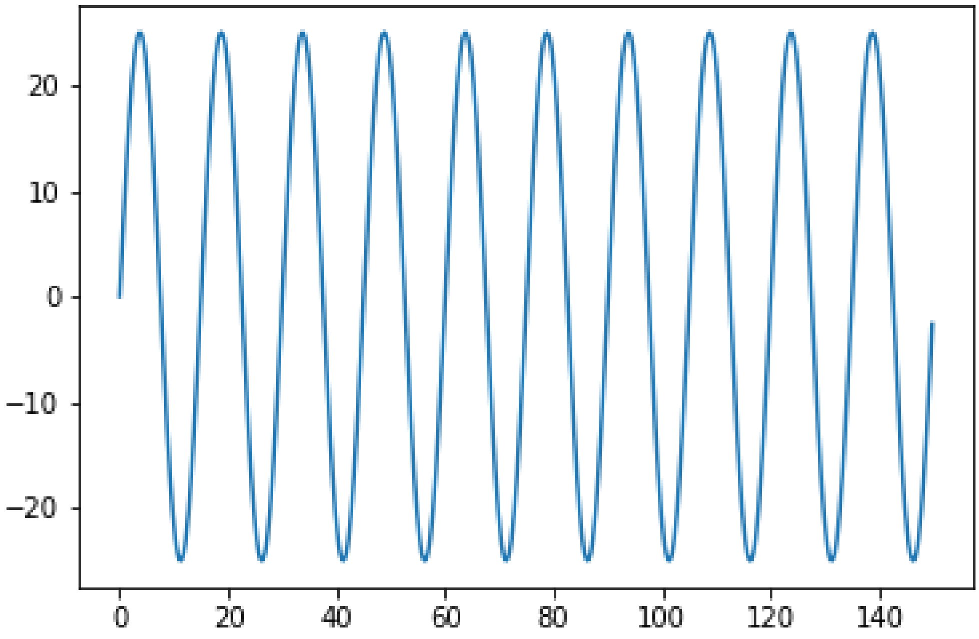
```
In [3]: import numpy as np
        import GCode
        import GRBL

        cnc = GRBL.GRBL(port="/dev/cnc_3018")

        print("Laser Mode: {}".format(cnc.laser_mode))
```

```
Laser Mode: 1.0
```

```
In [4]: from enum import IntEnum
        class LaserPower(IntEnum):
            CONSTANT = 0
            DYNAMIC = 1

        def init(power = LaserPower(0), feed = 200, laser = 25):
            program = GCode.GCode()
            program.G21() # Metric Units
            program.G91() # Rel positioning.
            program.G1(F=feed) # Set the feed rate
            program.G0() # But keep the laser off.
            if power==LaserPower.CONSTANT:
                program.M3(S=laser) # Laser settings
            else:
                program.M4(S=laser) # Laser settings
            return program

        def end():
            program = GCode.GCode()
            program.M5() # Te
            return program
```

```
In [5]: Tmax = 150
        T = np.arange(0, Tmax, 0.25)
```

```
In [6]: # Plot Cycles
        cycles = 10

In [7]: T_period = Tmax / cycles
        freq_hz = 1/T_period

In [8]: amplitude = 25
        phase = 0

In [9]: %matplotlib inline

In [10]: import matplotlib.pyplot as plt

In [11]: Y = amplitude*np.sin(2*np.pi*freq_hz*T + phase)

In [12]: plt.plot(T, Y)

Out[12]: [<matplotlib.lines.Line2D at 0x7f99d1e65f98>]
```



```
In [13]: dT, dY = np.diff((T, Y))

In [14]: cnc_sin = GCode.GCode()
         for idx in range(len(dT)):
             cnc_sin.G1(X="{:.4f}".format(dT[idx]),
                        Y="{:.4f}".format(dY[idx]))

In [15]: class SoftKill(Exception):
             pass
```

```
In [16]: try:
             cnc.run(init(laser=255))
             cnc.run(cnc_sin)
             cnc.run(end())
         except KeyboardInterrupt:
             cnc.serial.flushOutput()
             cnc.cmd("!")
             cnc.reset()
             raise(SoftKill("Keyboard"))
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    ---------------------------------------------------------------------------

    KeyboardInterrupt                         Traceback (most recent call last)

    <ipython-input-16-43c7226be5a3> in <module>()
      2     cnc.run(init(laser=255))
----> 3     cnc.run(cnc_sin)
      4     cnc.run(end())


    ~/python_cnc3018/python_rs274/GRBL/__init__.py in run(self, program, compact)
    120                 print(".")
--> 121                 results = self.read(multiline=True, timeout=0.1)
    122


    ~/python_cnc3018/python_rs274/GRBL/__init__.py in read(self, multiline, timeout)
     36         if multiline:
---> 37             responses = self.serial.readlines()
     38             responses = [response.decode().strip() for response in responses]
    ~/.venv3/lib/python3.5/site-packages/serial/serialposix.py in read(self, size)
    482             try:
--> 483                 ready, _, _ = select.select([self.fd, self.pipe_abort_read_r], [], [
    484                 if self.pipe_abort_read_r in ready:


    KeyboardInterrupt:


During handling of the above exception, another exception occurred:


    AssertionError                            Traceback (most recent call last)

    <ipython-input-16-43c7226be5a3> in <module>()
      6     cnc.serial.flushOutput()
      7     cnc.cmd("!")
----> 8     cnc.reset()
      9     raise(SoftKill("Keyboard"))


    ~/python_cnc3018/python_rs274/GRBL/__init__.py in reset(self)
     55         """
     56         ret = self.cmd("\x18")
---> 57         assert(ret[-1] == 'ok')
     58
     59     def sleep(self):


    AssertionError:
```