

# Artificial Intelligence

## Introduction to signal processing

1. Open the IPython console (you can use any python editor) and type in the example below:

```
1  >>> import numpy as np # recommended convention
2  >>> x = np.array([1,1,1],dtype=np.float32)
3  >>> x
4  array([ 1.,  1.,  1.], dtype=float32)
5  >>> x.itemsize
```

Line 1 imports Numpy as np and line 2 creates an array of 32 bit floating point numbers. The `itemsize` property shows the number of bytes per item.

2. Now input the following code:

```
>>> np.sin(np.array([1,1,1],dtype=np.float32) )
array([ 0.84147096,  0.84147096,  0.84147096], dtype=float32)
```

3. Based on Appendix in “Python for Signal Processing” (Jose Unpingco) book, p.36, practice the signal processing sampling theorem.
4. Consider a signal  $x(n) = [-3, 1, 2, -2, 3, -1]$ . Using IPython console make a plot of the following signals:
  - (a)  $x(n)$
  - (b)  $x(2 - n)$
  - (c)  $x(\frac{2}{3}n + 1)$
  - (d)  $x(n^2)$
  - (e)  $x(2^n)$
  - (f)  $x(2^n - n^3)$