Generation of Complex Exponential

Using Euler's relation

$$e^{j\alpha} = \cos\alpha + j\,\sin\alpha.$$

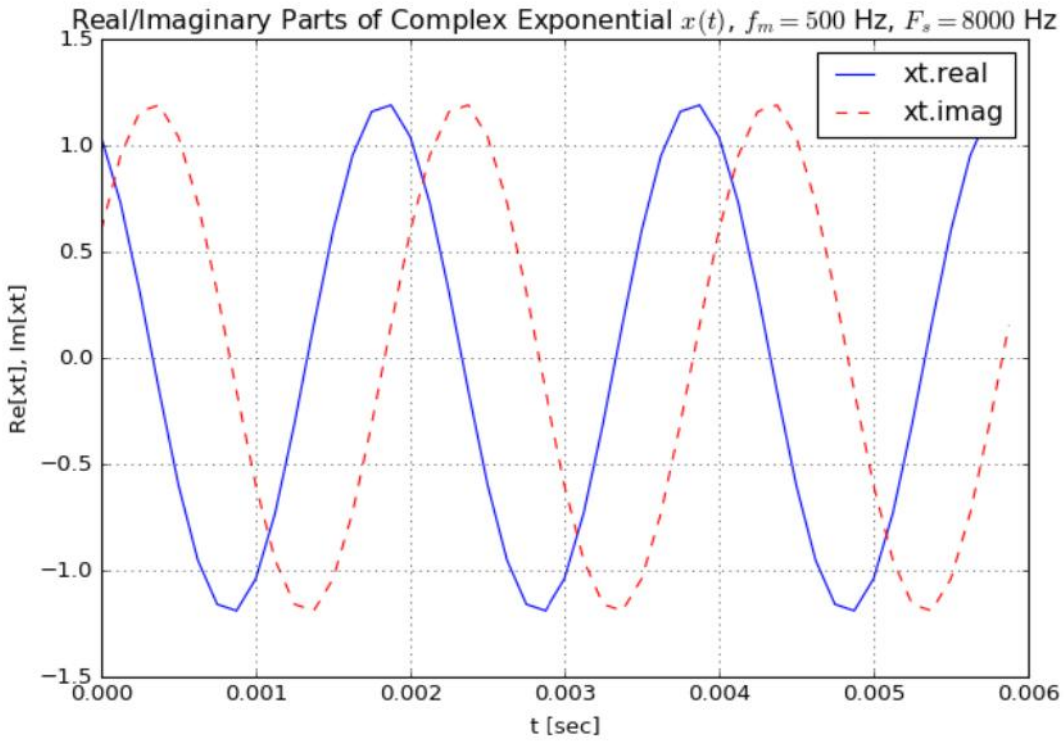
In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
%matplotlib notebook
fsz = (9,6)  # figure size
fsz2 = (fsz[0],fsz[1]/2.0)  # half high figure
```

In [3]:
```
# parameters
Fs = 8000   # sampling rate
fm = 500    # frequency of sinusoid
phi = 30    # phase in degrees
A = 1.2     # amplitude
tlen = 1.0  # length in seconds
```

In [4]:
```
# time axis
tt = np.arange(np.round(tlen*Fs))/float(Fs)
# complex exponential
xt = A*np.exp(1j*(2*np.pi*fm*tt + np.pi/180*phi))
```

In [5]:
```
plt.figure(1, figsize=fsz)
plt.plot(tt[:48], xt[:48].real, '-b', label='xt.real')
plt.plot(tt[:48], xt[:48].imag, '--r', label='xt.imag')
plt.ylim([-1.5, 1.5])
plt.ylabel('Re[xt], Im[xt]')
plt.xlabel('t [sec]')
strt1 = 'Real/Imaginary Parts of Complex Exponential $x(t)$'
strt1 = strt1 + ', $f_m={}$ Hz, $F_s={}$ Hz'.format(fm, Fs)
plt.title(strt1)
plt.legend(loc=1)
plt.grid()
plt.savefig('complexp_500a.eps')
```



In [ ]: