Due: 2018/11/08

1. Compute the Fourier transforms the following signals; and plot the corresponding transform functions using Python. The prototype of the window function is

$$x(t) = \begin{cases} w(t), & -\frac{\tau}{2} < t < \frac{\tau}{2} \\ 0, & \text{elsewhere} \end{cases}$$

Assume that $\tau = 1$ and the range for t-axis is ± 2.

(a) $w_1(t) = 1$

(b) $w_2(t) = 1 - 2\frac{|t|}{\tau}$

(c) $w_3(t) = 0.5 + 0.5\cos\left(\frac{2\pi t}{\tau}\right)$

(d) $w_4(t) = \frac{t}{\tau} + \frac{1}{2}$

(e) $w_5(t) = \cos\left(\frac{\pi t}{2}\right)$

(f) $w_6(t) = e^{-0.5(t+\frac{\tau}{2})}$

In your report, please also include the Python source codes and plots for each window function.