Homework #04

Problem 1

1. Describe CTFS.
2. Describe DTFS.

Problem 2

$$x_p[n] = x_p(nT_s)$$

$$x_p(t) \xleftrightarrow{\text{CTFS}} X_p[k]$$

$$x_p[n] \xleftrightarrow{\text{DTFS}} \tilde{X}_p[k]$$

Prove that $\quad \tilde{X}_p[k] = f_s \sum_{m=-\infty}^{+\infty} X_p[k - mN]$

Problem 3

Recall HW01

$$x_1(t) = e^{-at}[u(t) - u(t-T)]$$

$$x_p(t) = x_1(t) * \sum_{l=-\infty}^{+\infty} \delta(t - l \times T)$$

Calculate $X_1(f)$ and $X_p(f)$.

Please use MATLAB to plot $\quad x_p(t) \quad x_p[n] \quad \left|X_p[k]\right| \quad \left|\tilde{X}_p[k]\right|$