

Homework #02

Problem 1

1. Describe CTFT.
2. Describe DTFT.

Problem 2

Impulse Sampling $x_{\Delta}(t) = x(t) \times \sum_{n=-\infty}^{+\infty} \delta(t - nT_s)$

Point Sampling $x[n] = x(nT_s)$

1. Prove that $X_{\Delta}(f) = X(f) * f_s \sum_{k=-\infty}^{+\infty} \delta(t - kf_s)$
2. Prove that Find the relationship between CTFT of Impulse Sampling and DTFT of Point Sampling.

Problem 3

$$x(t) = e^{-at} \cos(2\pi f_o t) u(t) \quad (a > 0)$$

$$x_{\Delta}(t) = x(t) \times s(t) \quad s(t) = \sum_{n=-\infty}^{+\infty} \delta(t - n)$$

1. Calculate $X(f)$ and $X_{\Delta}(f)$.
2. For $a=0.1$ and $f_o=0.1$
 - a. Plot $x(t)$ using MATLAB
 - b. Calculate $X(f)$ and plot in using MATLAB
 - c. Plot $x_{\Delta}(t)$ using MATLAB
 - d. Calculate $X_{\Delta}(f)$ and plot in using MATLAB
3. For $a=0.1$ and $f_o=0.4$, redo 2.
4. Discuss the difference between 2 and 3.