ECS 332: In-Class Exercise # 11 - Sol

Date: 1 1 / 1 0 / 2019

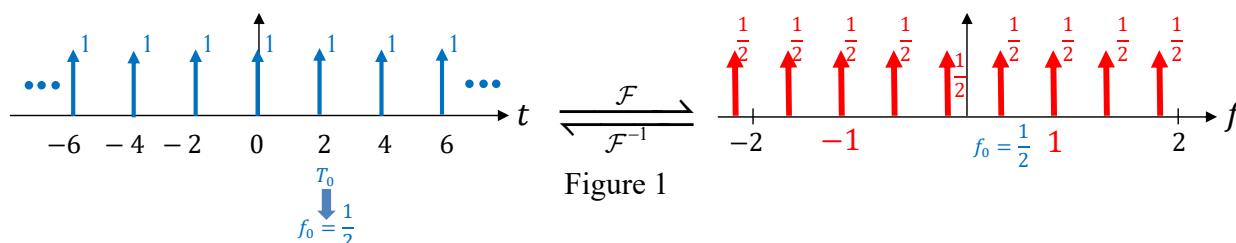| Name		ID (last 3 digits)		
Prapun		5	5	5

Instructions

1. Separate into groups of no more than three students each.
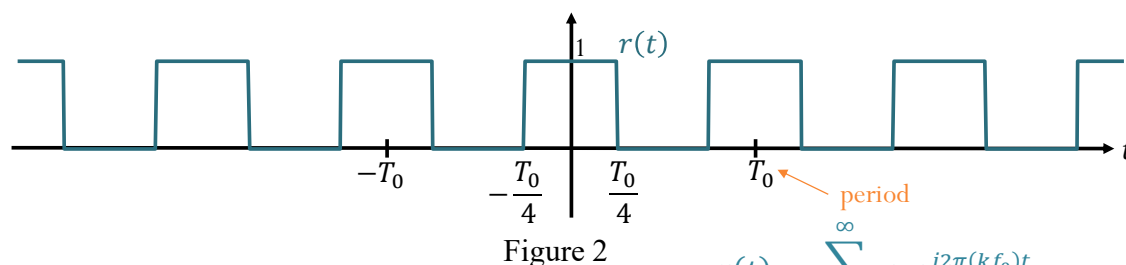2. Explanation is not required for this exercise [ENRE]
3. **Do not panic.**

1. Consider the impulse train $g(t)$ shown on the left in Figure 1. Plot its Fourier transform $G(f)$ from $f = -2$ to $f = 2$.

Figure 1

2. Consider the rectangular pulse train $r(t)$ shown in Figure 2.

Figure 2

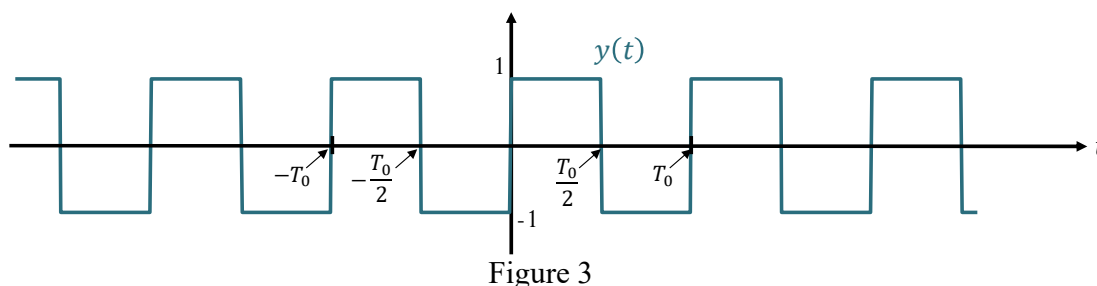$$r(t) = \sum_{k=-\infty}^{\infty} c_k e^{j2\pi(k f_0)t}$$

Using Fourier series expansion, we can write $r(t)$ in the form

$$\cdots \boxed{\frac{-1}{3\pi}} e^{j2\pi(-3f_0)t} + \boxed{0} e^{j2\pi(-2f_0)t} + \boxed{\frac{1}{\pi}} e^{j2\pi(-f_0)t} + \boxed{\frac{1}{2}} + \boxed{\frac{1}{\pi}} e^{j2\pi(f_0)t} + \boxed{0} e^{j2\pi(2f_0)t} + \boxed{\frac{-1}{3\pi}} e^{j2\pi(3f_0)t} + \cdots$$

with c_0, c_1, c_2, c_3 labeled above the respective terms.

where $f_0 = \dfrac{1}{T_0}$. Write the appropriate Fourier coefficients in the boxes above.

3. Consider the rectangular pulse train $y(t)$ shown in Figure 3.

Figure 3

Compare with Figure 1. Observe that $y(t) = \alpha + \beta r(t - \gamma T_0)$. Find the constants α, β, and γ.

$$\alpha = \underline{\ -1\ } , \ \beta = \underline{\ 2\ } , \ \gamma = \underline{\ 1/4\ }$$