ECS 332: In-Class Exercise # 10.1

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. **Explanation is not required for this exercise.**
3. **Do not panic.**

Date: 17 / 10 / 2018			
Name	ID (last 3 digits)		
Prapun	**5**	**5**	**5**

1. Consider the impulse train $g(t)$ shown on the left in Figure 1. Plot its Fourier transform $G(f)$ from $f=-2$ to $f=2$. Explanation is not required for this question.

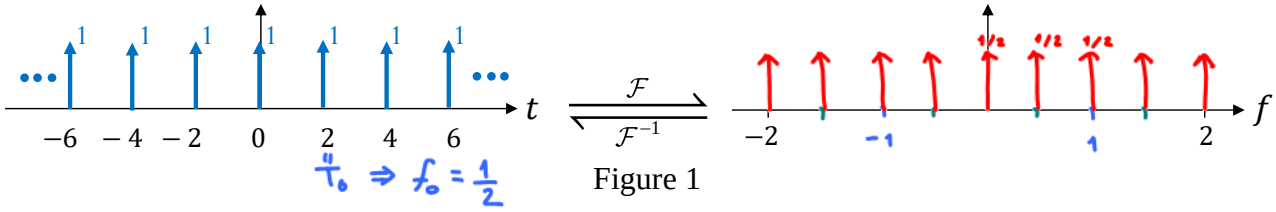

Figure 1

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

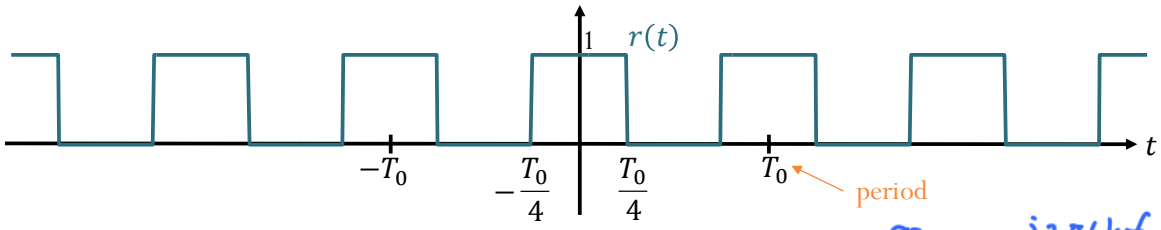

Figure 2

$$r(t) = \sum_{k=-\infty}^{\infty} c_k e^{j2\pi(kf_0)t}$$

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

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

(c_0, c_1, c_2, c_3; same; same)

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

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

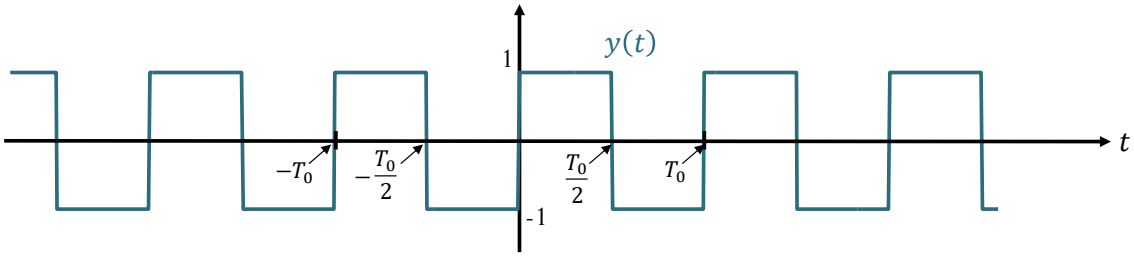

Figure 3

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

$\alpha =$ **−1**, $\beta =$ **2**, $\gamma =$ **$\frac{1}{T}$**