



**Lecture 1 Exercises**

1. Given the signal  $f(t) = t^3 + t + t^2$ , find the even and odd components of  $f(t)$ .
2. Plot the signal

$$f(t) = \begin{cases} t & 0 \leq t < 1 \\ 0 & \text{elsewhere} \end{cases}$$

Then, find its even and odd parts and plot them.

3. Find the even and odd parts of  $f(t) = 2t^4 - 5t^3 + 2t^2 + t - 4$ .
4. Determine the even and odd components of  $g(t) = \frac{1}{t-1}$ .
5. Find the even and odd components of the function shown in Figure Pro. 5.

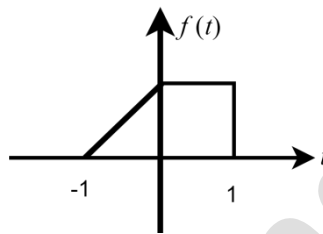


Figure: Pro. 5

6. Draw the even and odd components of the signal in Figure Pro. 6.

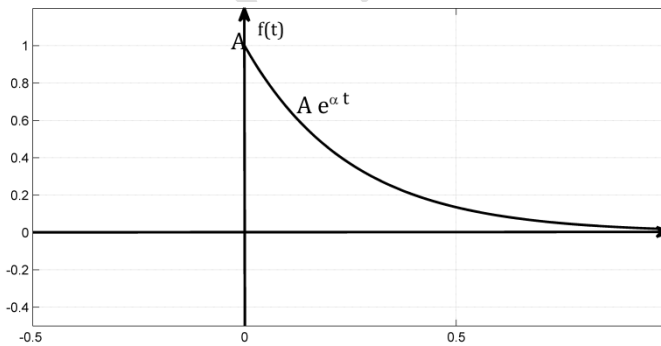


Figure: Pro. 6

7. Sketch the even and odd parts of the signals depicted in Figure Pro. 7.

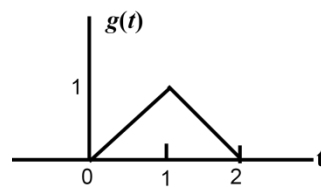


Figure: Pro. 7



8. Sketch the even and odd parts of the signals depicted in Figure Pro. 8.

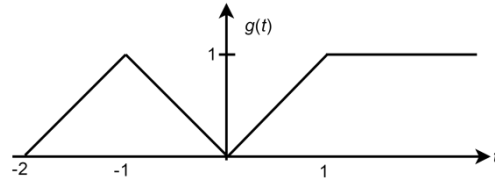


Figure: Pro. 8

9. Sketch the even and odd parts of the signals depicted in Figure Pro. 9.

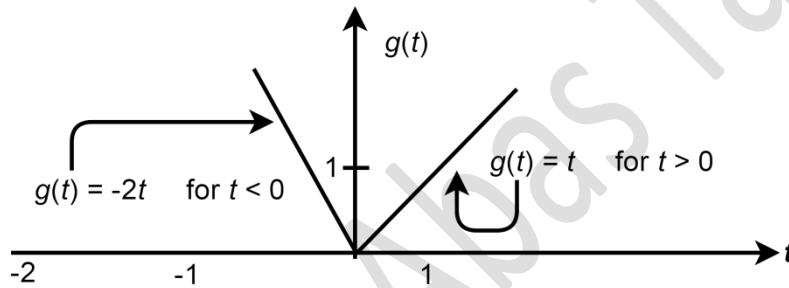


Figure: Pro. 9

10. Find the even and odd components of the signal  $h(t) = \cos(t) + \sin(t) + \sin(t) \cos(t)$ .
11. What are the even and odd parts of the signal  $y(t) = 1 + t \cos(t) + t^2 \sin(t) + t^3 \sin(t) \cos(t)$ .
12. Given  $f(t) = \left| \sin\left(\frac{-5\pi t}{8} + \frac{\pi}{2}\right) \right|$ , estimate if it is periodic or not periodic, if it is periodic, find its fundamental period  $T_0$ .
13. Given  $f(t) = \sin\left(\frac{6\pi t}{7}\right) + 2 \cos\left(\frac{3t}{5}\right)$ , estimate if it is periodic or not periodic, if it is periodic, find its fundamental period  $T_0$ .
14. Given  $f(t) = e^{\frac{j3\pi t}{8}} + e^{\frac{\pi t}{86}}$ , estimate if it is periodic or not periodic, if it is periodic, find its fundamental period  $T_0$ .
15. Is  $r(t) = 7\sin(2\pi t) (3 + \cos(2\pi 2t))$  even?
16. Find if  $c(t) = 41t^2 + \cos(7t)$  even or odd?
17. Check the periodicity of  $h(t) = \cos(\pi t) \sin(3\pi t)$ , if it is periodic, find its fundamental period.
18. Is the following signal periodic? Why?

$$g(t) = \begin{cases} \cos(10\pi t) & -12 \leq t \leq 12 \\ 0 & \text{elsewhere} \end{cases}$$



19. Sketch and find what is the best measure of the signal  $r(t) = 3$  when  $|t| < 3$ .
20. Sketch and determine the best measure of the signal  $x(t) = 4t^3$  when  $|t| < 1$ .
21. What is the best measure of the signal shown in Figure Pro. 21? Calculate it.

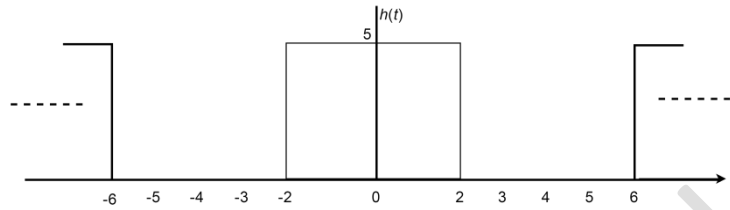


Figure: Pro. 21



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