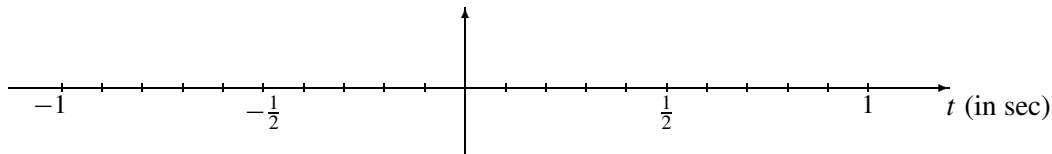


PROBLEM:

Suppose that a periodic signal is defined (over one period) as: $x(t) = \begin{cases} 1 & \text{for } 0.2 < t < 0.5 \\ -1 & \text{for } 0 < t < 0.2 \end{cases}$

- (a) Assume that the period of $x(t)$ is 0.5 s. Sketch $x(t)$ over the ENTIRE range $-1 \leq t \leq 1$ s.



- (b) Write the general Fourier integral expression for the coefficient a_k in terms of the specific signal $x(t)$ defined above. *Set up all the specifics of the integrals (e.g., limits of integration), but do not evaluate the integrals. All parameters in the integrals should have numeric values.*
- (c) Evaluate the Fourier integral below. Simplify your answer and express it in **polar form**.

$$\frac{1}{2} \int_0^1 \sin(\pi t) e^{-j2\pi(1)t/2} dt$$