ECE102, Fall 2020 **Discussion 4**
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1. **Fourier coefficients of basic signals**

   Compute the fourier coefficients, c_k, of the following signals:

   (a) $f(t) = \delta(t - \lambda)$, where $0 \leq \lambda < T_o$

   (b) Half-wave rectified sine, $f(t)$, defined as

   $$f(t) = \begin{cases} sin(2\pi t/T_o) = sin(\omega_o t), & 0 \leq t < T/2 \\ 0 & T/2 \leq t < T. \end{cases}$$

   (c) $f(t) = 1 + \cos(2\pi t)$

2. **Fourier coefficients of transformed signals**

   Let $f(t)$ be a periodic signal, with fundamental period T_0 and Fourier series coefficients a_k. Express the fourier coefficients of the following signals in terms of a_k

   (a) $f(t - t_0)$

   (b) $f(-t)$

   (c) $f(\alpha t)$, $\alpha > 0$

3. **Eigenfunctions of LTI systems**

   Determine if the following signals are eigenfunctions of LTI systems

   (a) $f(t) = t^2$

   (b) $f(t) = e^{jwt}u(t)$