

ECE 307 — Homework #3

1/22/20 (due **Thursday, 1/30 by 5 pm**)

You can slide the homework under my door any time Thursday.

1. Show from the definition that for energy-limited $x(t)$, the autocorrelation $R_x(\tau) = x(t) * x(-t)|_{t=\tau}$, and for power-limited $x(t)$, the time-average autocorrelation can be written as $R(\tau) = \lim_{T \rightarrow \infty} \frac{1}{2T} [x(t) * x(-t)]|_{t=\tau}$.
2. Obtain the spectral density, autocorrelation, and signal energy for $x(t) = A \text{sinc } 2W(t - t_d)$.
3. Find the autocorrelation, signal energy, and energy spectral density for $x(t) = Ae^{-bt}u(t)$.
- 4-5. Z&T (Ed. 6): 2.71, 2.73 (same as 2.63, 2.65 in Ed. 5)