EECS 307 — Homework #4
1/29/20 (**due 2/7/20**)

1. Given the bandpass filter

$$H(f) = \begin{cases} 1 & 1000 \le |f| < 1100 \\ 1/2 & 950 \le |f| < 1000 \\ 0 & \textit{otherwise} \end{cases}$$

Find the complex envelope $\tilde{h}(t)$, and the in-phase and quadrature components $h_I(t)$ and $h_R(t)$, assuming $f_c = 1000$. Determine the envelope and phase of the impulse response $h(t)$. (You do *not* need to simplify your answers.)

2-3. Z&T (Ed. 6): 2.74, 2.75

4. Let $m(t) = (cos\ 2\pi f_m t)u(t)$ with $f_m \ll f_c$. Sketch $x_c(t)$ and indicate the envelope when the modulation is AM with $a < 1$, AM with $a > 1$, and DSB.

5-6. Z&T (Ed. 6): 3.5, 3.10