EE 308: Communication Systems

Homework 2

1. We have covered the all sections from Chapter 3 of the text.

2. The discussion in Section 3.8 is about bandpass signals and systems and their low pass representations. In the class, I used the notation as in Handout 1.

3. As you read through Chapter 3, you are also expected to understand the solved examples in these sections of the text.

4. Also, solve the drill problems in the text as you read through the chapter.

5. End of chapter problems from Chapter 3: 20, 22, 24, 25, 28, 31.

6. Consider an ideal bandpass filter with bandwidth B and centre frequence f_0. Find the impulse response $h_b(t)$ for this filter, its Hilbert transform $\hat{h}_b(t)$ and the envelope of $h_b(t)$. Note that the envelope is a mathematical quantity and it may not be obviously identifiable from the bandpass signal.

7. Let $x_b(t) = \text{rect}(t/T)\cos(2\pi f_0 t)$ be the input to a filter with impulse response $h_b(t) = ae^{-at}u(t)\cos(2\pi f_0 t)$. Let $y_b(t)$ be the output of the filter. Obtain $x_l(t)$, $h_l(t)$, and $y_l(t)$ and also the complex envelope of the output of the filter.