Homework 2

Communication Systems (EE 308), Autumn'19

1) The following problems from Haykin, Chapter 3: 3.5 to 3.9, 3.11 to 3.18, 3.20 and 3.24 on pp. 97 - 100.
2) The cross-correlation of real-valued functions $g_1(t)$ and $g_2(t)$ is given by:

$$R_{12}(\tau) = \int_{-\infty}^{\infty} g_1(t) g_2(t-\tau) dt.$$

   (a) Show that the Fourier transform of $R_{12}(\tau)$ is $G_1(f)G_2^*(f)$.
   (b) Using the result of part (a), show that $g(t)$ and its Hilbert transform $g_h(t)$ are orthogonal.
3) When the modulating signal is a sinusoid $m(t) = \cos(2\pi f_m t)$, find the SSB modulated signal in each of the following cases:
   (a) The SSB modulated signal consists of the upper side-frequencies only.
   (b) The SSB modulated signal consists of the lower side-frequencies only.