Homework #7
Due Tu. 3/20

1. (OW 4.37)

2. (OW 4.38)

3. (OW 4.43)

4. (OW 4.44)

5. (OW 4.51)

6. Correlation

   (a) Let the correlation be defined as

   $$r(t) = \int_{-\infty}^{\infty} x(\tau)y(t + \tau)d\tau.$$

   Express $R(j\omega) = \mathcal{F}\{r(t)\}$ in terms of $X(j\omega)$ and $Y(j\omega)$, the Fourier transform of $x(t)$ and $y(t)$ respectively.

   (b) Suppose $x(t) = y(t) = e^{-|t|}$. Find $R(j\omega)$ by evaluating the convolution integral in the time domain to get $r(t)$ and then doing the FT.

   (c) Find $R(j\omega)$ again, this time using frequency domain properties and the relationship derived in (a).