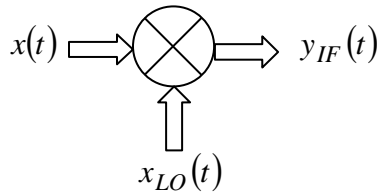


HOMEWORK ASSIGNMENT #1

Problem 1. Analyze and plot the mixer outputs signals $y_{IF}(t)$ for the following cases:



a) $x(t) = \cos \omega_{RF} t$; $\omega_{RF} > \omega_{LO}$
 $x_{LO}(t) = \cos \omega_{LO} t$

b) $x(t) = \cos \omega_{RF} t$; $\omega_{RF} = \omega_{LO}$
 $x_{LO}(t) = \cos \omega_{LO} t$

c) $x(t) = \cos \omega_{RF} t + \cos \omega_{IMAG} t$
 $x_{LO}(t) = \cos \omega_{LO} t$
 for $\omega_{RF} > \omega_{LO}$
 $\omega_{IMAG} = 2\omega_{LO} - \omega_{RF}$

d) $x(t) = x_r(t) + jx_i(t) = e^{-j\omega_{RF} t} + e^{-j\omega_{IMAG} t}$
 $x_{LO}(t) = x_{LOr}(t) + jx_{LOi}(t) = e^{j\omega_{LO} t}$
 where
 $\omega_{RF} > \omega_{LO}$ and $\omega_{IMAG} = 2\omega_{LO} - \omega_{RF}$

e) Same as d) with $x(t) = x_r(t)$

What signals of $y_{IF}(t)$ would you filter out?

Problem 2. Look for a commercial product that uses a wireless communications system and is not a cellular phone nor PDA. Provide a summary describing this application and references.

Reading Assignment: Razavi Chapter 5.1, 5.2 and 5.5 and 2.1 to 2.4