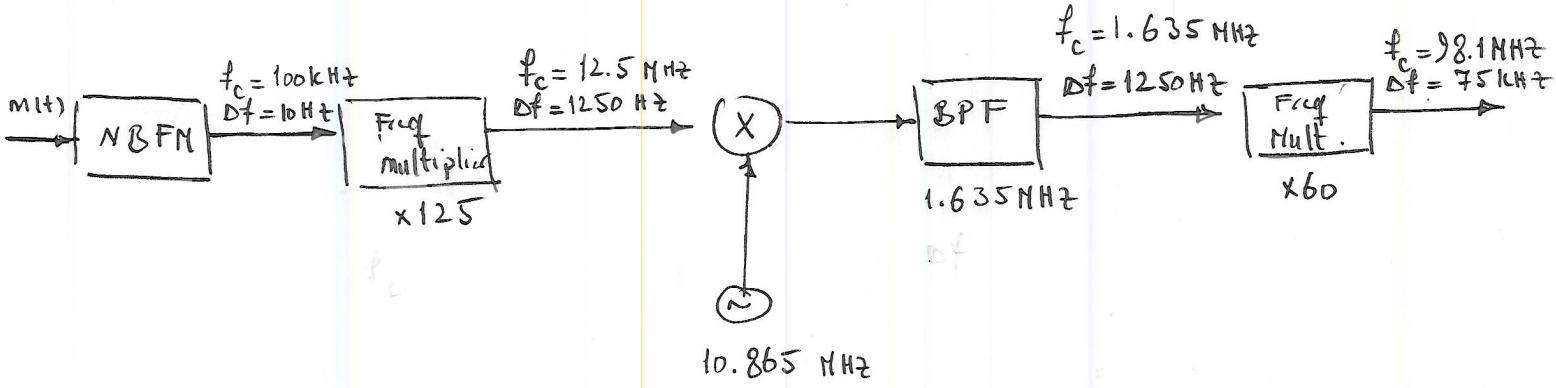
EEE 421: Solutions for Homework Set 5

5.3-1



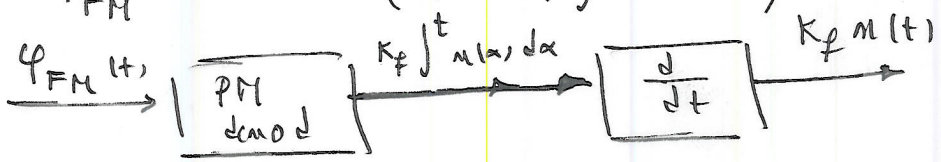
5.4-1

(a) $\varphi_{PM}(t) = A\cos\left(\omega_c t + k_p m(t)\right)$

← acts as a PM demod →

If $m(t)$ has a discontinuity $\dot{m}(t) = \infty$ at the point(s) of discontinuity and the system will fail.

(b) $\varphi_{FM}(t) = A\cos\left(\omega_c t + k_f \int^t m(\alpha)\, d\alpha\right)$



← acts as an FM demod →

Doesn't matter if $m(t)$ is continuous or not.

6.2-3

$B = 4.5$ MHz

(a) $f_{NYQ} = 2 \times 4.5 = 9$ MHz

$f_s = 1.2 f_{NYQ} = 10.8$ MHz

(b) $L = 1024$

$M = \log_2^L = \log_2^{1024} = 10$ binary pulses

(c) $BPS = M \times f_s = 10 \times 10.8 = 108$ Mbps

$BW = \frac{BPS}{2} = \frac{108 \times 10^6}{2} = 54$ MHz