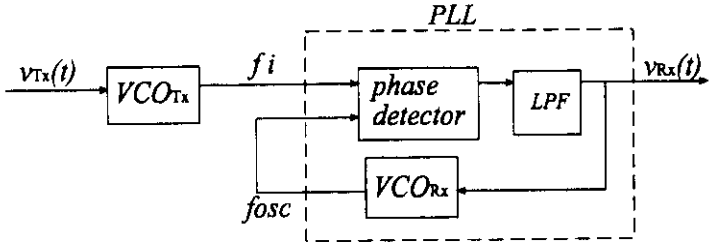
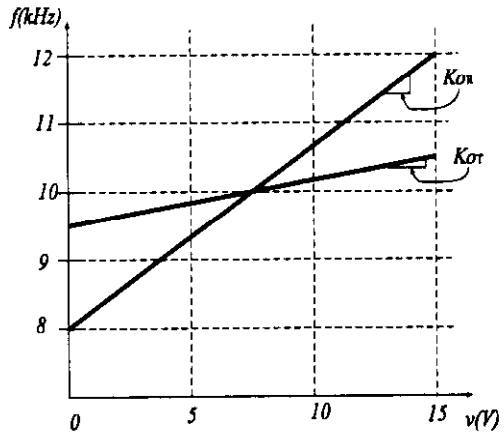
ECEN 4618
Advanced Electronics Lab
Spring 1999
Quiz # 5a

Name: SOLUTION





A block diagram of an FSK modem is shown above. The VCOs in the transmitter and receiver have gains KOT and KOR respectively and the two VCO characteristics are shown in the graph above. You can assume that the PLL is **locked**.

(2 points) Find the two VCO gains, KOT and KOR:

$K_{OT} = \frac{1}{15}$ KHz/V $= 0.067$ KHz/V $\quad K_{OR} = \frac{4}{15}$ KHz/V $= 0.267$ KHz/V

(2 points) Express *fi* as a function of $v_{Tx}(t)$ and KOT in the form y = mx + b:

$f_i = K_{OT}\, v_{T_x}(t) + 9.5$ KHz

(2 points) Express *fosc* as a function of $v_{Rx}(t)$ and KOR in the form y = mx + b:

$f_{osc} = K_{OR}\, v_{Rx}(t) + 8$ KHz

(6 points) For the case when $v_{Tx}(t)$ = 8.5 volts (constant), find *fi* , *fosc* , and $v_{Rx}(t)$:

$f_i = 10.07$ KHz

$f_{osc} = f_i \Rightarrow v_{Rx}(t) = 7.74$ V

(3 points) For the case when $v_{Tx}(t)$ = (7.5 sin(wt) + 7.5)volts, find $v_{Rx}(t)$:

$$v_{Rx}(t) = 1.88 \sin(\omega t) + 7.5$$