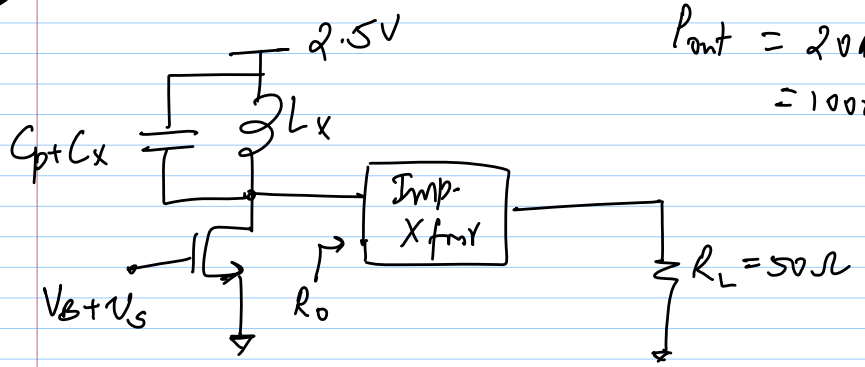
11/11/13

Lec 42



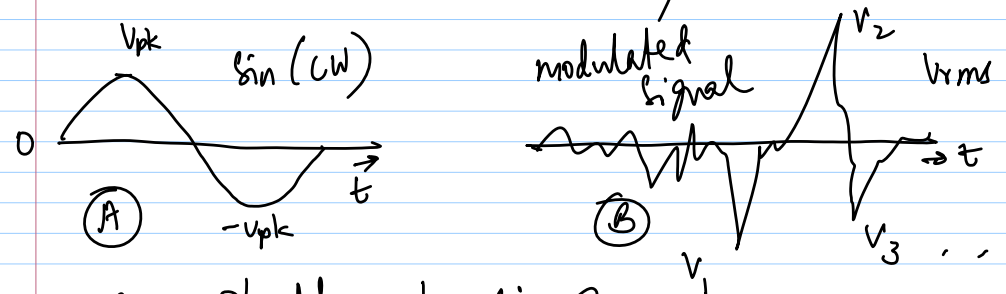
$P_{out} = 20\,dBm = 100\,mW$

Assume $V_{o,min} = V_{DSAT} + V_{margin}$

linearity: EVM, ACPR

* Design for good IIP2 & IIP3

→ correlate this w/ EVM & ACPR



* PA should not clip @ V_1, V_2, V_3 etc.

(A): $P_{out} = \frac{V_{pk}^2}{2R_o}$; $V_{pk} = V_{rms} + 3\,dB$

(B): $P_{out} = \frac{V_{rms}^2}{R_o}$; $V_{pk} = V_{rms} + PAPR$

e.g. LTE Signal PAPR ~ 10dB

* At same V_{DD} etc., we can deliver only 1/10th the power we can deliver with CW.

* Actual modulated power we can deliver = 10dBm

new Spec P_{out} (mod.) = 10dBm

$P_{out}(max) = 20\,dBm$, $P_{out}(mod.) = 10\,dBm$

$V_{DD} = 2.5V$, $R_L = 50\Omega$

* $R_o = ?$

$V_{DSAT} = 100\,mV = V_{margin}$

$V_{o,min.} = 200\,mV.$

V_o (ampl.) $= 2.3V$

$100mW = \frac{(2.3)^2}{2R_o} \Rightarrow R_o \sim 25\Omega$

$I_{DC} = \frac{V_o(ampl.)}{R_o} \simeq 100mA$

* gain = ? (Voltage gain)

→ Mixer needs to deliver $v_{in(PA)}$ while meeting EVM & ACPR

e.g. $v_{in_{PA}}$ = 230 mV (pk.), gain = 10

* Efficiency $\eta = \frac{P_{out}}{P_{sup}} \times 100$

$\eta^{max}_{class\ A}$ =