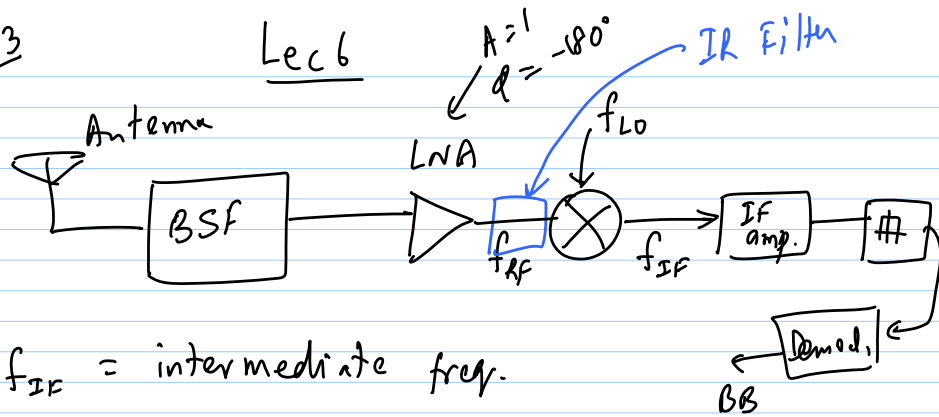
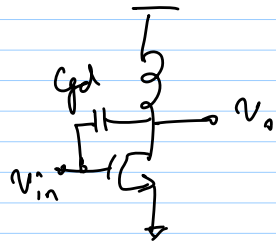


14-8-13

Lec 6



f_{IF} = intermediate freq.

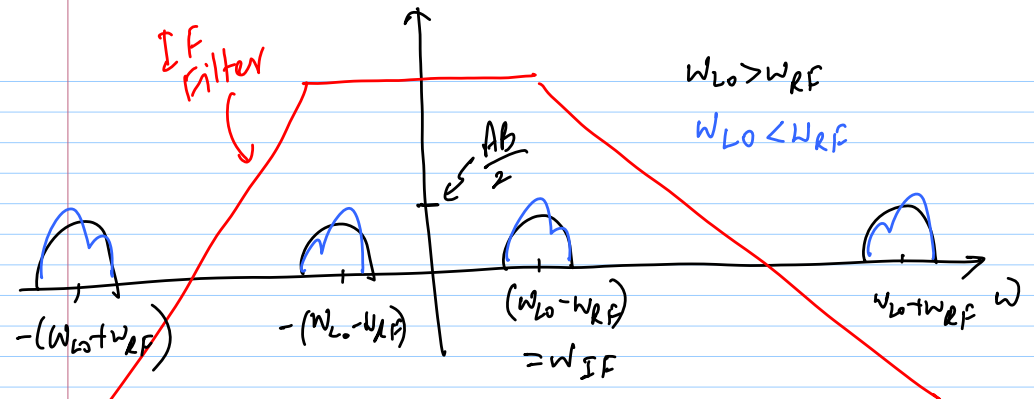
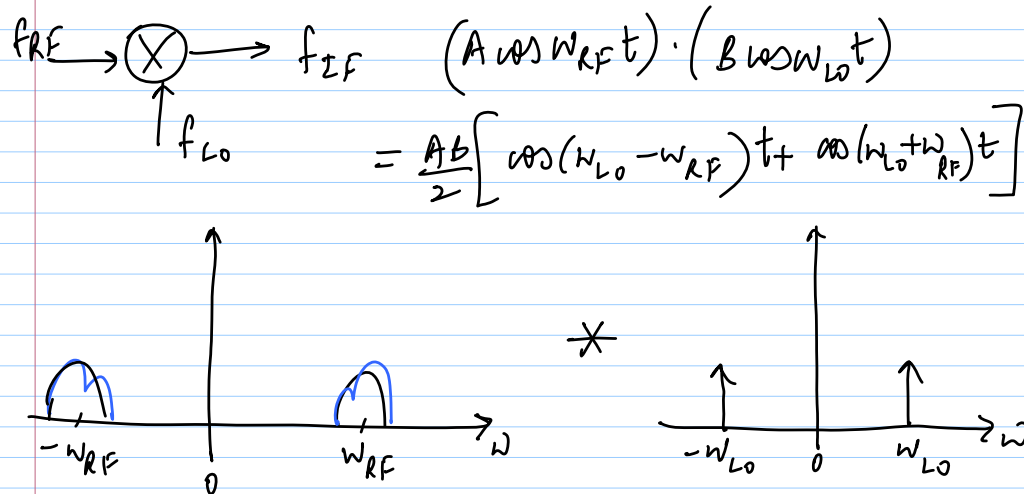


Single-conversion
Super-Heterodyne
Receiver

Linearity



Mixer Operation



* For easy IF design, we want small w_{RF} (high gain & high-Q filters)

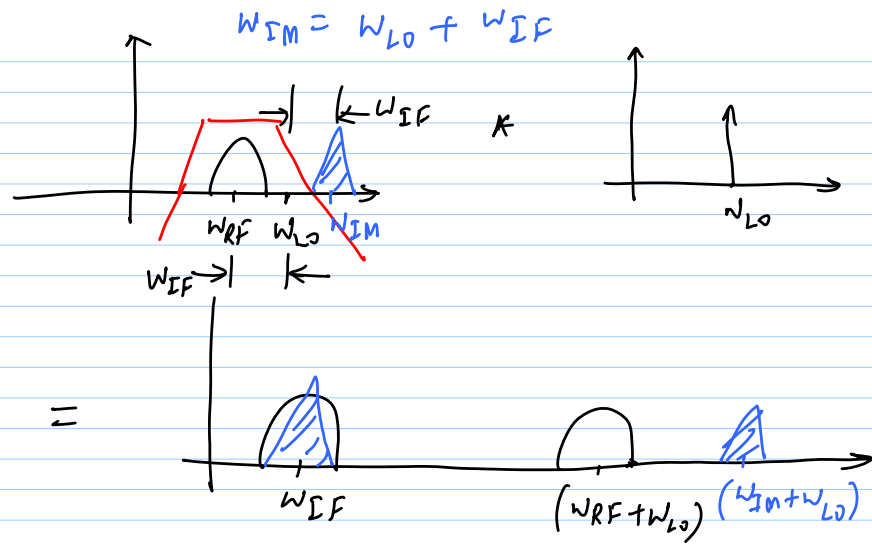


Image:

$$(C \cos \omega_{IM} t) \cdot (B \cos \omega_{LO} t)$$

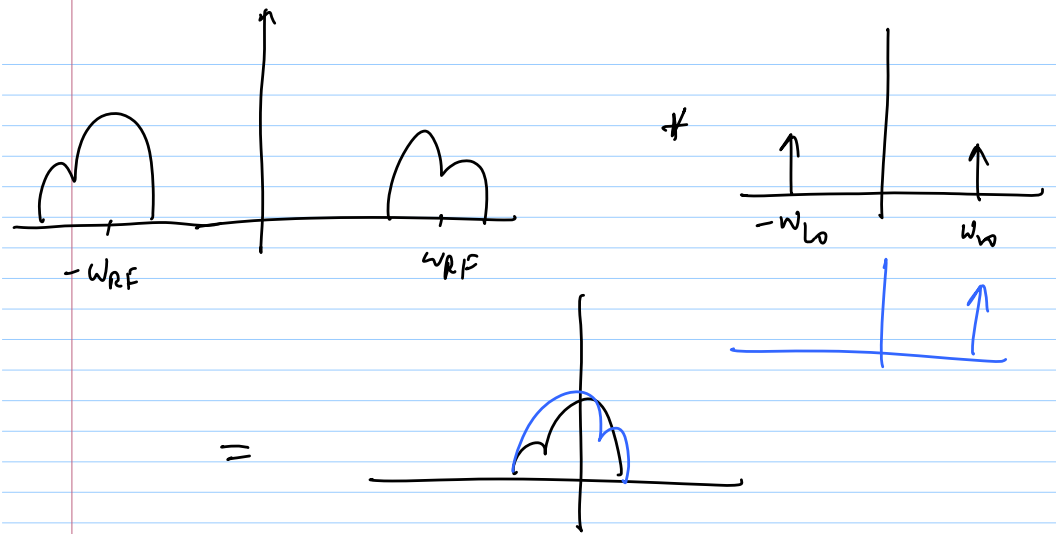
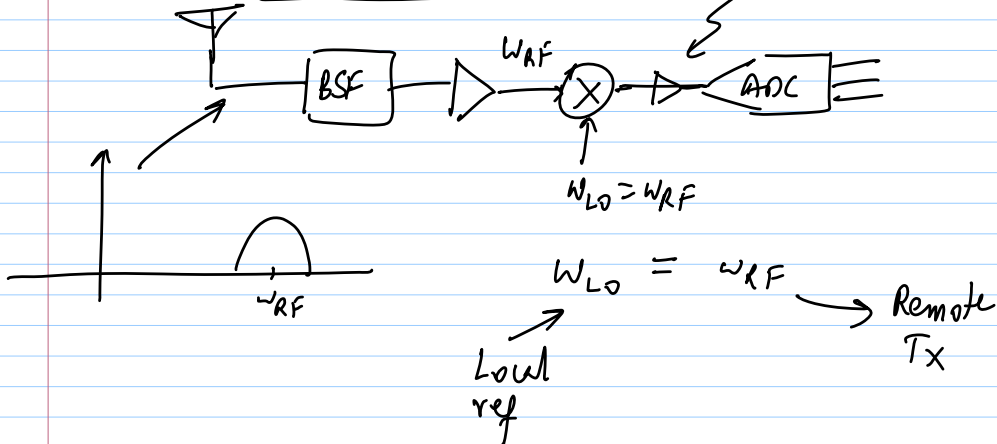
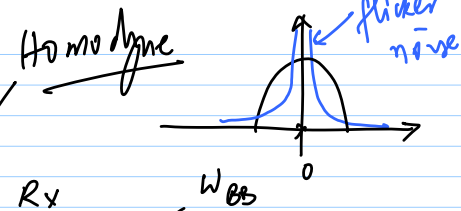
$$= \frac{BC}{2} \left[\cos(\underbrace{\omega_{IM} - \omega_{LO}}_{\omega_{IF}}) t + \cos(\omega_{IM} + \omega_{LO}) t \right]$$

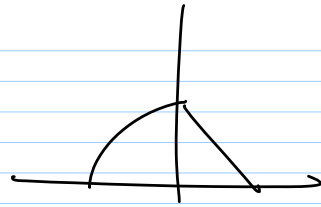
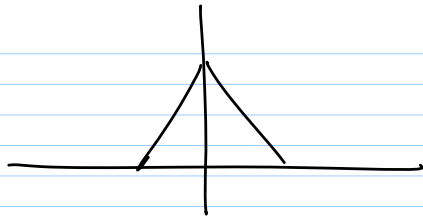
- * Filter out ω_{IM} components just before the mixer
- * IRF desires large IF

Choosing $IF = 0$

$\omega_{LO} = \omega_{RF}$

Direct-conversion Rx





$$|X(f)| = |X(-f)|$$

Real signals

