Lec 5

Receiver Design

1. Channel: Spectrum of freq./band
   - TDMA: Max in time
   - FDMA: Max in freq. domain

2. Band - aggregate all user channels

3. Rx band of user = Tx band of BS
   - vice versa

4. Tx & Rx bands are the same for all users
   - in band interferers & OOB interferers

Rx arch.

1. Tune to band of interest (BSF)
   - OOB interferers are attenuated
   - tuning to channel requires high Q tunable filters
Noise Sources

1) Shot Noise - diodes, BJTs
   dep. on DC current:

   ![Image of a diode with reverse bias]

2) Resistor thermal noise - R

3) Flicker noise - MOSFET, BJTs

4) MOSFET thermal noise - MOSFETs

\[
\bar{i}^2 = \frac{2e\sqrt{I_D}}{R_i}
\]

\[
\frac{1}{\text{R}} \text{ noise } S_f = \frac{4kT}{R}
\]

\[
\frac{1}{\text{flicker noise}} S_f = \frac{K_t}{W(L)(f)^\alpha}
\]

\[
\text{MOS thermal noise } \frac{\bar{i}}{S_f} = 4kT \frac{2}{3} \sqrt{f}
\]