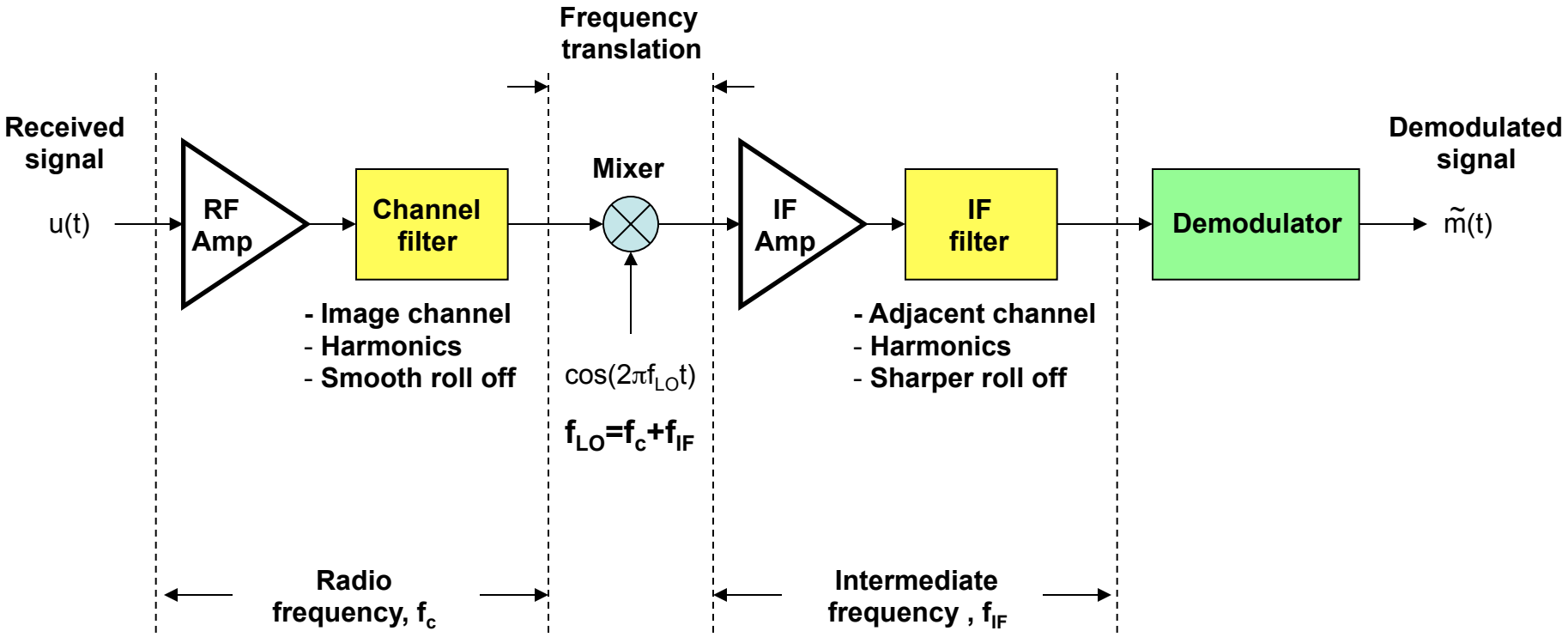
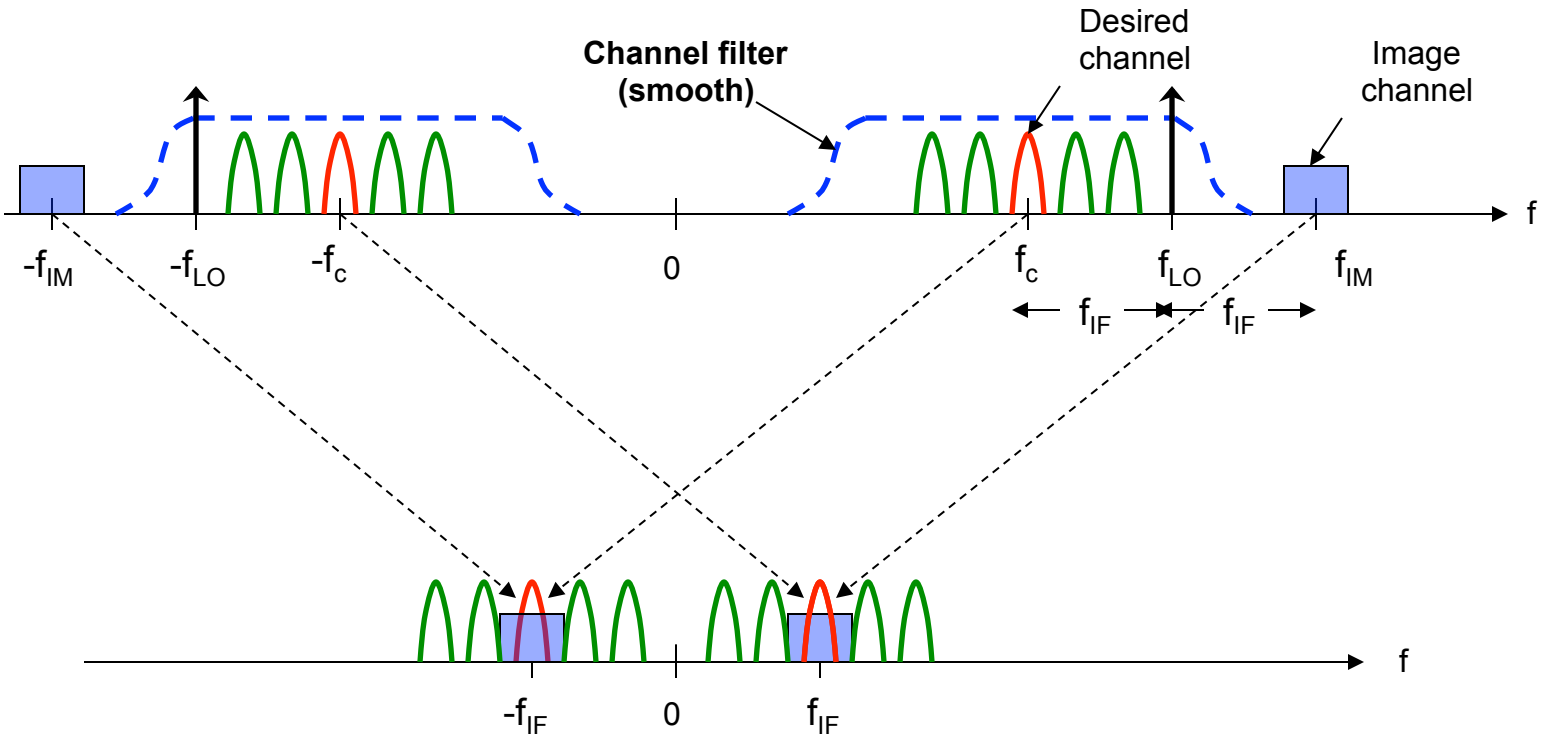
Super-heterodyne receiver: Notes and MATLAB demo

The super-heterodyne receiver

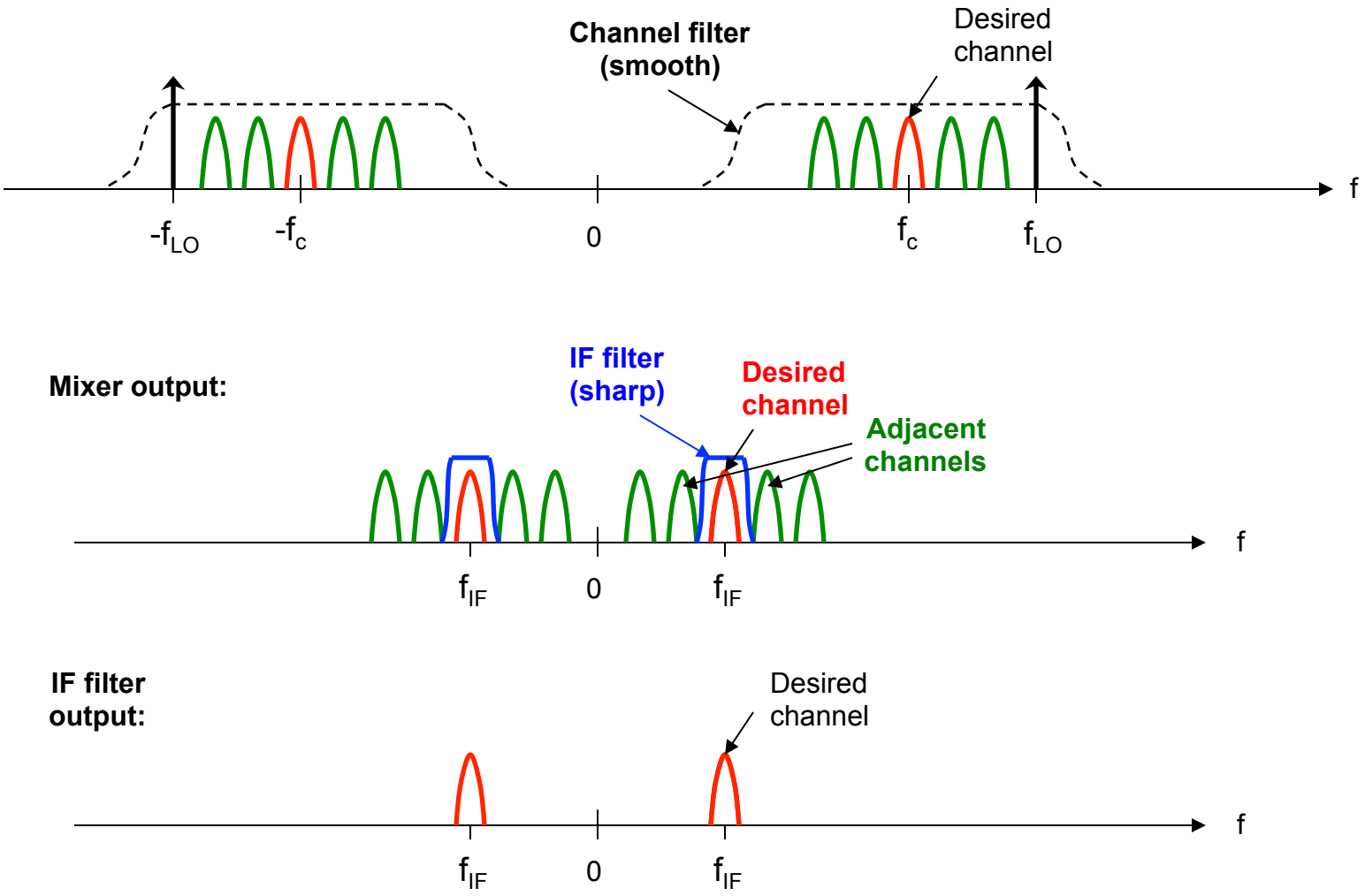


NOTE: Selecting $f_{LO}=f_c- f_{IF}$ results in an ***infra-heterodyne*** receiver

Image channel problem

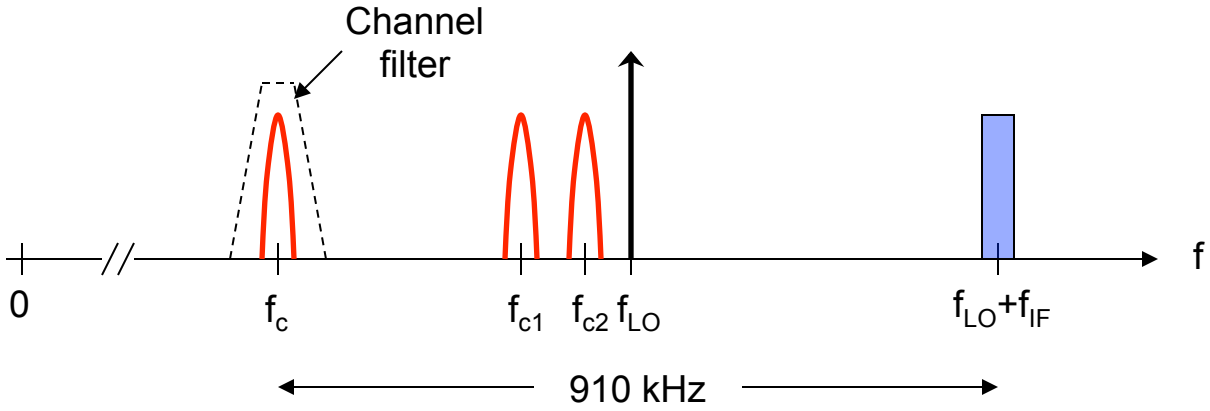


IF filter characteristics



MATLAB demo

- Desired channel (3 KHz sinusoidal): f_c = 560 kHz (B=10 kHz)
- f_{IF} = 455 kHz
- f_{LO} = 1015 kHz



- Two in-band channels: f_{c1}=920 kHz, f_{c2}=960 kHz (both B=10 kHz)
- One image channel (sawtooth waveform) at $f_{IM}=f_{LO}+f_{IF}$=1470 kHz
- The channel filter (B=20 kHz) can be set on and off via a manual switch in the model