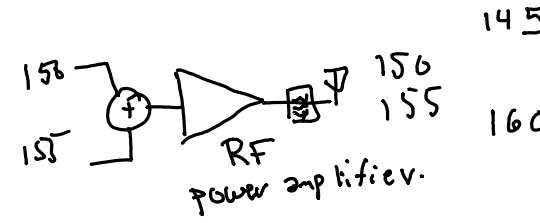
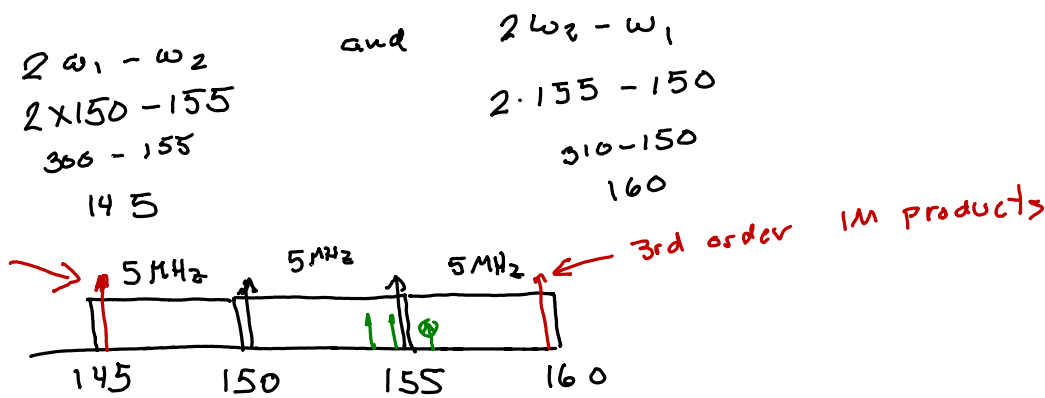


RF Design - IP3

Exercise 1: If the two input frequencies are 150 and 155 MHz, what are the frequencies of the third-order products? If these two frequencies represent the lower and upper frequencies of a channel, what is the channel bandwidth? Where would the third-order products fall relative to the adjacent channel?



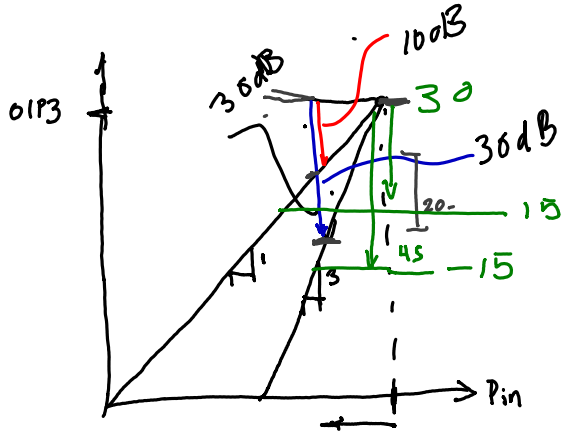
$$\textcircled{5th} \quad \underline{3\omega_1 - 2\omega_2}$$

$$\textcircled{2nd} \quad 2\omega_1 \quad \& \quad 2\omega_2$$

$$\underline{\underline{300}} \quad \quad \quad \underline{\underline{310}}$$

← further away from desired signal & easier to filter out.

Exercise 2: An amplifier has an OIP3 of 30dBm. If it is required that the adjacent channel power be 30dB below the in-channel power, what is the maximum output power we should try to get from this amplifier?



2x reduction in relative 3rd power for every 1x reduction in desired power for 30 dB reduction need $\frac{30}{2} = 15$ dB below OIP3.

\therefore operate the amplifier at output of $30 \text{ dBm (OIP3)} - 15 \text{ dB} = 15 \text{ dBm}$.

15 dBm desired & -15 dBm 3rd order power.