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- (a) Please briefly describe what the image interference is.
- (b) Suppose the receiver use local oscillator at L_o MHz and receive two RF signals respectively centered at 0.55 MHz and 1.75 MHz. Please choose a local oscillator frequency L_o causing the image interference.
- (c) As a system designer, how to solve the problem mentioned in (b) ?

2. Using the message signal

$$m(t) = \frac{1}{1+t^2}$$

Determine the modulated waves for the following methods of modulation:

- (a) Amplitude modulation with 50 percent modulation.
- (b) Double sideband-suppressed carrier modulation.
- (c) Single sideband modulation with only the upper sideband transmitted.
- (d) Single sideband modulation with only the lower sideband transmitted.
3. An FM signal with a frequency deviation of 10 kHz at a modulation frequency of 5 kHz is applied to two frequency multiplier connected in cascade. The first multiplier doubles the frequency and the second multiplier triples the frequency. Determine the frequency deviation and the modulation index of the FM signal obtained at the second multiplier output. What is the frequency separation of the adjacent side frequencies of this FM signal?