EES 351: In-Class Exercise # 14

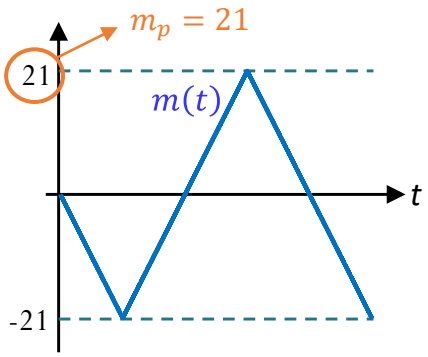
Instructions

1. Work alone or in a group of no more than three students. **The group cannot be the same as any of your former groups after the midterm.**
2. Only one submission is needed for each group.
3. **[ENRE] Explanation is not required for this exercise.**
4. You have two choices for submission:
   (a) Online submission via Google Classroom
   - PDF only.
   - Only for those who can directly work on the posted files using devices with pen input.
   - Paper size should be the same as the posted file.
   - No scanned work, photos, or screen capture.
   - Your file name should start with the 10-digit student ID of one member.
     (You may add the IDs of other members, exercise #, or other information as well.)

   (b) Hardcopy submission
5. **Do not panic.**

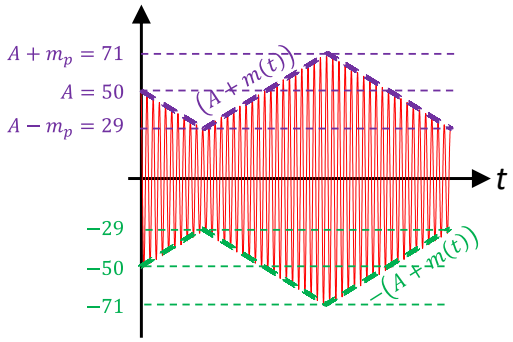
Date: 28 / 10 / 2020			
Name	ID (last 3 digits)		

Consider an AM transmission of the message $m(t)$ whose plot is provided.
All plots in this exercise are shown over the same time interval.



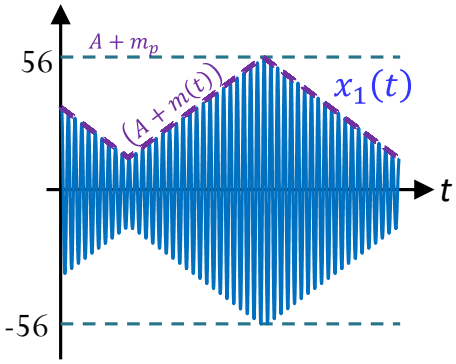
1. Assume that the carrier frequency f_c is large (enough). Plot the corresponding AM signal $x_{\text{AM}}(t)$ when the modulation index is 42%

$$\mu = \frac{m_p}{A}$$
$$A = \frac{m_p}{\mu} = \frac{21}{0.42} = 50$$



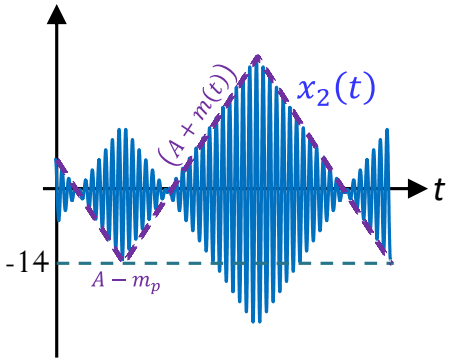
2. In each part below, the AM signal is plotted. Determine the modulation index used in each case.

(a)



$$A + m_p = 56$$
$$A + 21 = 56$$
$$A = 35$$
$$\mu = \frac{m_p}{A} = \frac{21}{35} = \frac{3}{5} = 0.6 = 60\%$$

(b)



$$A - m_p = -14$$
$$A - 21 = -14$$
$$A = 7$$
$$\mu = \frac{m_p}{A} = \frac{21}{7} = 3 = 300\%$$