EE 421: Communications I
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Assignment 2: DSB-LC (AM) Modulation and Demodulation
Do **NOT** submit this assignment. It will be included in the Test material.

Q1. Assume that the baseband message signal $m(t) = \alpha \cos(\omega_m t) = 2\cos(2\pi \times 25 \times t)$, and the unmodulated carrier is $c(t) = \cos(2\pi \times 210 \times t)$. Use MATLAB to sketch the AM modulated signal in time domain in the interval [0, 0.1] seconds. Sketch $\phi_{AM}(t)$ for three cases (modulation indices):

(a) m = 0.5,
(b) m = 1,
(c) m = 3.

Q2. Using the diagrams you sketched, calculate the modulation index in each case using the special-case equation for tone modulation:

$$m = \frac{\max - \min}{\max + \min}$$

Q3. Now sketch the envelope $E(t)$ for each one of the signals you generated in Q1 above. You can do that in MATLAB using the Hilbert transform as follows:

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abs(hilbert(signal))
```