

**Faculty of Engineering & Technology – Electrical & Computer Engineering Department**

**Second Semester 2021 – 2022**

Communication Laboratory ENEE4113

***Experiment 1 - Prelab***

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SAM (t) = Ac [1 + µ cos(ωmt)] cos(ωct)

The mathematical expression of the demodulated signal = Ac` [1 + µ cos(ωmt)]

The figure below shows the demodulated signal for all three cases (µ=0.22, µ=1, µ=1.85), with fm = 800hz, fc= 8000hz, Ac = 16v.



As shown in the figure for each signal the demodulated signal is in blue and its reflective value is in orange, while the modulated signal is in yellow.

when µ<1 the demodulated signal never reaches 0, when µ=1 its minimum value is 0, if µ>1 then the demodulated signal will go make a smaller wave signal as shown in the 3rd figure.

The code:

fm=800;

fc=8000;

u1=0.22;

u2=1;

u3=1.85;

Ac=16;

t=0:0.000000001:0.003;

D1= Ac.\*(1 + u1.\*cos(2\*pi\*fm\*t));

De1= abs(D1);

D2= Ac.\*(1 + u2.\*cos(2\*pi\*fm\*t));

De2= abs(D2);

D3= Ac.\*(1 + u3.\*cos(2\*pi\*fm\*t));

De3= abs(D3);

s1= De1.\*cos(2\*pi\*fc\*t);

s2= De2.\*cos(2\*pi\*fc\*t);

s3= De3.\*cos(2\*pi\*fc\*t);

title("Normal Am Modulation");

subplot(2,2,1), plot(t,De1,'-', t,-De1,'-', t,s1,'-');

axis([0, 0.003, -30, 30]);

xlabel("Time"), ylabel("Demodulated signal µ=0.22");

subplot(2,2,2), plot(t,De2,'-', t,-De2,'-', t,s2,'-');

axis([0, 0.003, -40, 40]);

xlabel("Time"), ylabel("Demodulated signal µ=1");

subplot(2,2,3), plot(t,De3,'-', t,-De3,'-', t,s3,'-');

axis([0, 0.003, -50, 50]);

xlabel("Time"), ylabel("Demodulated signal µ=1.85");