# Amplitude modulation & Demodulation

AIM: 70 Study to function of Am & DM (world),
Penfect , over) and also to (will ate the modifien
index.

Apportons: i) PC with who does

2) MATLAB

3) AM & OM . tooler kit.

a) CROID + June 1200 14 (3)

s) fundion grandon

6) asids 4 Poobes

The mag signal is given by the expression

Em(t) = Em cosumt

EM -> Amplitude

CV EcCt) = Ec ros Wct

E(+) = EC + Ka Em coshint

KaEm coswert -> change 90 coorder amplitude

Ka > constant

E=E(F) coswel

From above 2 equitions.

E = ( Ec + ka Em (oswat) coswet

E = (1+ KaEM/Ec cossimt) Ec cos wet

E = Ec (1+Macosumt) coswet

Ma = KaEm / Ec

100\* Ma gives to porcetage of nedelation

HM - MODURADI :

AM- demodulater:

Am sig 
$$\begin{cases} Product & v(t) & fow \\ Product & Product \\ Product & Pr$$

### PROCEDURE:

- i) open to module so Alwans and click on now
- 2) you go to script pad and ugite the code accordingly 3) Now save to till with to come
- 4) NOW END HE BEOGLAW and vote all operation of who in observation.

$$\Rightarrow$$
 fm = 2;  
fc = 50;  
t = 0; 0.001;1;  
Ac = 0,2;  
Am = 0,0;

Ka = 0,2; Ka, = 0A;

Ka2 = 4:

message = Am Sin (2 Pi of final); (assiss = Ac\* Sin(2\*P; \*fc\*+).

modulated-signal = (1+Ka # message), casies. magnifored - zidugi = (1+ Kal wasval,); (sogia); modulated\_sgral2 = (1+Ka, massage) a cassios;

```
Support (41511),
plat (timessage);
fifte (, wastabe zillug,);
 x label ('Time(s)');
 y label ( 'Amplitude');
     subplot (a, 2,2);
      Plot (timaion);
      l'ille (' cassion signa))
      xlabel ('Time(si);
      Ylabel ('Amplitude');
 Subplace, 3,3);
 plot (L. makulated signal);
  (Congichetological) altit
  X label ('Time(s)');
  Y (abel ('Amplitude');
       subplot (4,2,4);
       Hot (t, modulated_signar);
       -title ( 'undo modelation stand');
        Xlabel ('Time (57'):
        Y label ( ) amplitude );
  Supplot (4,2,5);
  Plot ( E, modelater - signal a);
  Hitle (buck model for signil)
   X bod ( 'Time (s)'):
   Y label ( 'Amplitude');
     9, = madulated _symple (assis)
     [bia] = butter [1,0.01];
     mar = faller (bami):
     Supplot (4,2,8);
      Plot (humi):
      Eille ( , gowodnyted = , dwo _ tor [ Karyw = D) :
```

```
De = moundated_ signal & casies;
[Dia] = botton (1,000);
 wars = titter (pla ys);
 SUPHOF ( 4.24);
  Plot (t, manz);
 title ('domodulated signal for (ta, An=0.5)1);
   913 = modested_signal 2. A corosier;
   [bia] = botter (load);
    mas = butter (1,0.01);
    menz = Filter (ban 913);
    Subplot (4,2,8);
    Flot (+, mas);
    title ( demodulated signal for Eartin = 2:5));
```

Expected wavetoms:

# DSB-SC MOONEDion

EX-MOS T

AIH: TO study the cooking of the Balanced Modulater

APPORTUS: 1) PC with windows

3) MATLAB sufficient with communication tealbox

3) Balanced modulates trainer kit

- 4) (RO (20MHZ)
- 5) connecting and probes
- (31+41) storong nothino)

THEORY:

Bolanced modulator christ is used to generate only the two side bands DSB-SC. To belonced and offen system as a system of odding message to recoils wave frequency there by only the side bonds are produced. two en modulatous ossanged an a balanced confilable The AM modulation is assumed to be identical. emps si otalisam out it it trapor is same nest not prices and neargque so stanton so the System becomes suppressed capier 058-56. In this we need reinsent the corain then to system becomes suppressed in the we need reliser recovers is complicated and country. Hence te . DSB system may be used in policy to policy communication system. monoration of suppressed compiliated modulated volt balanced modulator may be of the following typos. this town it has been

Block O'ragram: Modulation: Pr Helutor Singul Gororata B Decol Mod Bon make (+)m: not bound Trivoder to wat xz(t) (ct) = cosainfet

## PROGRAM:

fm = 2; fc = 50; £ = 0;0:001:1; Pc = 002; Am = 0.5; mossage = And sin (24 Pi And E); Coodier = Act cos (200 (2000 fc+ t); Modelated-Signal =message & Casailes. subplot (9,7,1); Plot (+, nowage); title ('message signal'); x label ('Time(s)') y babel ('Asplitudo'); 306401 (411,3); Plot ( t. (copies); title (casie spen); x (abod ( Thro(s)'); rlabel ('AmAHudo');

sopplet (4/1/2); dop (+ " wager onted - 2 idlug). Eitle (1 DSBSC modulated signal"); xlabel ("Hone (s)"); y label ( 'Amplitude'); n = modelited-signal & coroller); [b,a] = botter (1,0.01); domadolated-signal = filta (baigi); support (4114); Plot timodelated-signal). title ( Demod Dated-signal); x label ( fine (s))? y (abel ( iAmplitude));

## PROCEDURE:

### FOR METLEBS

- i) apen the mattab software and cold on now.
- 2) reas goto script pad and write the code accordingly 3) was save to the with to come
- a) thou sou to beodow. wood upte of opportugion graphs in observation.

## Expected warelding:



Scanned with OKEN Scanner

## [x-00-3] Abotog & Walnuts H 28-022

Airis to generale ESA using those mother and adoption of see signal using syndroundus deterton.

#### App outus;

- o) A with windows MATTAR CONTRAL COMMUNICATIONS SONTANCE
  - 119 resilent 822 (E
  - 4) CRO (DOMAIS)
  - 5) Patch colds
  - 6) CRO PRODUS

#### Thody:

but to luther on not bosons seems of the width because they both south of towns in Esters band with which is equal to twice the markage Grodestath in SEE only one state that and 10 is used the other show and is expression at the toursmitter, but no internation is test Thus the communication channel needs to provide of some band with more only one side band is chammelted so the moderal of the eyelest to perferned to as EsB system it the less bound Signed may not be recovered from a ESE Elpho by the use at a glock mardeth. To have lander of the his horsesson of any send 19 Bes Drights of toller 212 to Sugrafino USB is mittelled by Her coming signal. Consider to control of the stand M(A): Am as was (d): No Coshdel MULLECTUS Af Am COSWM COS WCL lays to sea symp.

2 113 Goodgow !-Jw= 2; Ac = 50; 1:10.0:0 = 5 Ac=6; 18= mA w= 40x 60=(5x 61x +0xx); C = ACA cos (24 birtent); m" = An & Sin(24 Pinton +); Subplot (3,2,1); Ad (tim); title ('message signal'); X label ('thme (6)'); Ylobel ('Amplitodo'); subplot (3,2,2) = Plot (+, c): - Little (casein signal); x label ( Tho Cs)); y label ( 'Amplitoda'). Modulat signal = (mac)-(ma & Acosin (21pi. Subplot (3,2,8); Plot ( to moduled signal); title (15985C-USB nodelotton): xlabel ('Thre(s)'): ylabel 'Amplitude');

modulated\_signal = (m\*c) + (m\*\* Ac\* =: n(2\* Pi\* +c\*+);

subplot (3,24);

plot (4, modulated - signal);

fill e('ssesc (se modulation);

x label ('Time(s));

y label ('Amplitude');

## BOCE DURE :-

- Nober to unapp soft-war and click or von
- Disow go to script ped and with the code amounty
- 3) NOW SOND TO THE FILE WITH TE nome.
- a) non son the beordier and uppe of the contrapportien deals

expected was etems !-