UNPE-2

Linear programming prodem (LPP).

Definition behas i sou tours strong

optimizing (minimizing (ox) maximizing) are linear function of variables called the "objective function" subjected to the linear equation and (or) in equality's called the "constraint & Restriction"

General Formation of LPP:

In order to find the no decision variables of the objective function maximizing (08) minimazing of

30,100° 3= Sixit C2x2+ 130,00° 5xhan /

10 -> a11x1+a12x2+ + ain 2n(≤(or)2(or)2)b1

 $a_{21}x_1+a_{22}x_2+\cdots+a_{2pn}x_n [\leq (\alpha)z(\alpha)z]b_2$

am + am 22+ ···· + am 2n [(or) 2 (or)] b2

and all ri, ri are greater than zero (rizo, H rizin)

NOTE 1:- man = - cn 360 to 101019116A

indicate of bahasa on (Z) will along of age!

S. ENOTE 2: M9n = =0012 Sund Slover

bishbor of Frob Arm (Z) b sto form affect small.

(1) 10 10 10 10/de 10(2) 3d + asril (1d) 3mos

SLACK vosiables:

In order to reduce the constraints & type to make equal we needed to add a vorsiable; same in for sum (i) is called a slack variable; (a) promotion partially considerable (a) promotion partially considerable (a) promotion partially and sound soun

where a is called slack variable.

Susplues i vasiables/2-ido sil do establista

In order to reduce the constraints z

type to make equal we needed to subtract
of variable some hi for sum; is called

surplues variable.

29: 27+44 23
(d (0) = (10) =) argainst - crano Linguis

 $\frac{\chi_{2}}{2} = \frac{\chi_{2}}{2} =$

and sotrop no use crite lo bio

where a 95 called surplues variable.

Artifical variable:

In order to reduce the constraints z type to make equal we needed to subtract a variable some it for sum is it does not have basis matric we needed to added some (bi) then the variables of bi called

assifical vassable Eg: 21+272-73+01=3 271+572-74+92=9. 2 5 10 -1 [0 1] 2 1 12 13 14 a1 a2 where n3, n4 - surplus variable ai, az - Astifical vasiable: stand form of linear programing problem: the given L.P.P 95 maximization type the objective function. of man Z = C/1/1+G/12+ -- + Condo 7 = a11x1+a12x2++a1nxn = 61 aminitament + - + ambin = bn we need to added that slack variable of

the above 'm' constant then

anx1+ a12x2+ + anxn+ xn+1=b1 a211/1+a2212+ - - (111 + a212n+2n+2=b2 amphitamente + - - + amen + anth = bn

With the the transfer in the sale

2 ct +, m - of white

Matoix from of L-P.P:-
$$C = \left[C_1, C_2 - \cdots C_n \right]_{1,0} \cdot \cdots \cdot o \right]_{1 \times (m+n)}$$

Amy =
$$\begin{bmatrix} a_{11} - a_{12} & ... - a_{1n} & 0 & ... & 0 \\ a_{21} a_{22} & ... a_{2n} & 0 & ... & 0 \end{bmatrix}$$

$$\begin{bmatrix} a_{m1} & a_{m2} & ... & a_{mn} & 0 & ... \end{bmatrix}$$

1 Solve L.P.P for graphically

Minz = 3x +44

7

3x+44,212.

127424 212

720, 920

```
sol given that
       m9n==3x+44 ->M -> 0
        3x+4y Z12
         U 1271+24 Z12
    we need to write standard form
         Max 2 = 3x + 44 0 000000
        \frac{3}{3} 3x + 4y = 12 -1(a)
             12x+29=12 -1(b)
     from eqn (a) (6 4 (0) = 1 (0) = 1
        put woo, y=3; -M. (#. A). D.
        The popul A (0,3)
       Put y=0, n=4 also limited adr
        The point B (410)
      from eq (b) the orthographic sight
         put x=0, y=6
       The point c (0,6)
         Put 4=0, 1=1
         The point of o (110)
    ·Draw the Graph of above point Cextreme point]
                      Feasable region & unbounded
                        feasable solnie, e, B
```

Feasable means common region.

from eqh (a) & (b) 3x+4y=12 12x+2y=12The pornt $e\left(\frac{4}{7},\frac{18}{7}\right)$

The feasable region CEB & unbounded region of the feasable region $C \in \mathbb{R}$. The feasable region $C \in \mathbb{R}$ from eq (0) M = 3x + 4y at C(0.6), M = 3(0) + 4(6) = 24 at C(0.6), M = 3(0) + 4(6) = 24 at C(0.6), M = 3(0) + 4(0) = 12 The optimal soll Marin Z = 12 at $C \in \mathbb{R}$.

.. Here Alternative optimal solis.

Solve L.P.P

Max $z = 3\pi + 4y$. \Rightarrow $3\pi + 4y \leq 12$ $12\pi + 2y \leq 12$ $12\pi + 2y \leq 12$

220, 970

Man z = 3x +4y -1M-1C

 $3x + 4y \le 12$ $12x + 2y \le 12$ $x \ge 0, y \ge 0$

```
We need to write the standard form
        min2=3x +4y 000 . M. + (010) 0. 10
           3x+44=12-1(0) (E10) A 10
           カルナスカニノンープ(り)には、か、
      from eq(a)
           PO+ 1=0, 4=3
(co) in to co or the points A (0.3)
   (3), Put y=0, x=4
           The points B(C10)
       from eq (b) or longly law
           put x =0, y =6 0 and not sell selle
            the points C (016)
           Put 4=0, x=1
           The pornts 0 (10)
      Draw the Graph of above points Cextreme point
                  Feasable region and bounded
                  Fealuch Solh A, E, D,O
           OF Dear Brater of boson on
       from eqn (a) & (b)
                      S. H. CO - K. 109
            37+44=12
           12x+2y=120) 4 charge acil
         The points e (4,18)
         .. The feasable region, OAED, 93
                      bounded
        .. The feasable solution are OA GD
```

```
Rom eqn 0: M=3x+4y
       at 0 (0,0); M= 3(0)+4(0)=0
        at A (013); M = 3(0) + 4(3)=12
        at e (4,15); M=12
        at D (110); M= 3(1)+4(0)=3
         " The ophmal value of Mar 2=12 at A(013)
                      Que (4, 18)
         " Here "I has alternative"
                and optimal solution, mod
3 solve the Lpp for graphically
       man 2 = 20x +30y => M=10
         → 10x+30y ≤ 60 100 1001
            9x+15y = 45 = 1000 = 101.
and the energy of the object of the mercant
   Given that
Island by man 7 = 200, 4304 -20
    001310x + 30y = 60 - 10
           97 + 154 = 45 -1(6)
     we need to write standard form
       from eq(a)
                     (d) 3 (m) "po mod
       Put x=0, y=2
         The points A (0,2) we tree!
       Put 4=0, x=6 - 19, 2000 2011
        The points B(6,0)
         from eq (b)
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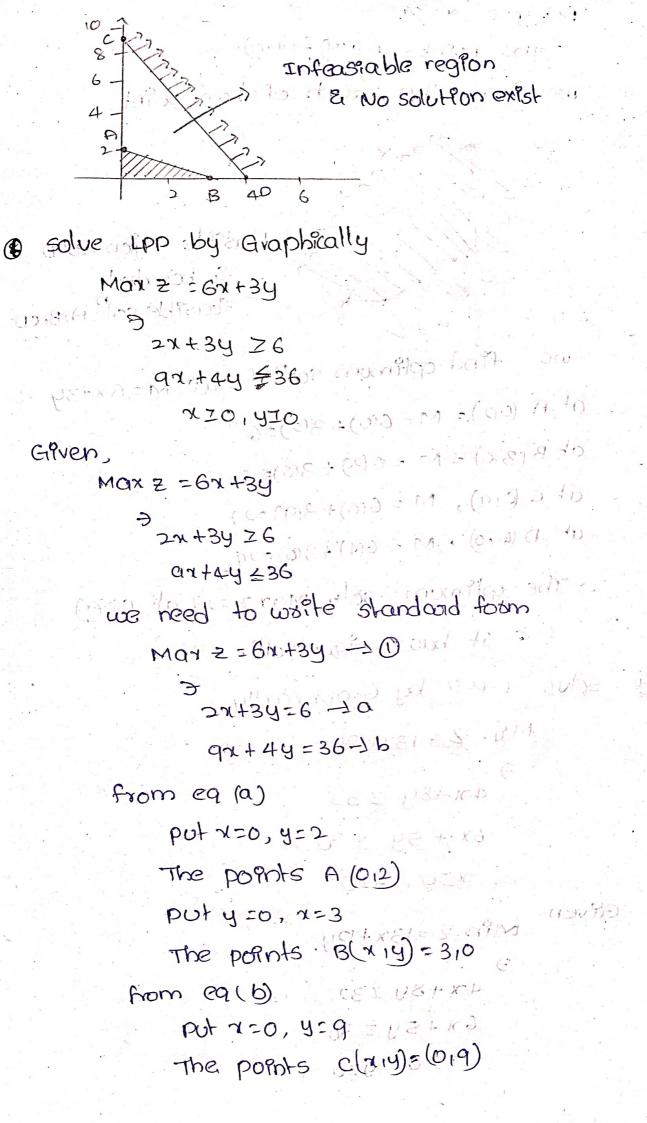
some without during intro-

The points c (013) put y=0, x=5 2/20 in 100 The pornts 0(510) is la large solve we down the graph of above extremal pornts (0,818 skillog salt 6 (d)mon feasible region si bounded region feasible solution (O, A, E, O) of sold forms sti from equal E(b) prop all work ou 10x+30y =60 97 +154 = 45 The points e (3.75,0.75) at 0 (0,0) M = 20 (0) + 30 (0) =0 A(012) M = 20(0) + 30(2) = 60 at D (5,0) M = 20(5) + 30(0) = 100. at E (3-75,075) m= 20(3-75)+30(0.75)=97.5 at 0 (5,0) we have unique optimal solution Many 7 = 100 mgo is at seath, exaltin solve the L-P-P for graphically max 2 = 57, +64 8x+44 264 25 x + 254 550 501 max == 5x+64 = M-10 Given 8x+4y =64 -1a 25x +25y=50 -16

put x=0,, y=3 photo ofform of book and

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INTO COURT
5 solve LPP by Graphically
       Max 2 = 6x +34
        € 27+3y 66
         92+44 Z 36
         100 7 20, 910 Mass of Logge 30
                 Personal Control
   Given that,
         Man = = 6x+34
            2×+34 26
            97+44 236
              720, 920
        we need to worke standard form
           Man 2 = 62+34 = M -10
           27+34 =6 (a) hora all
           9× + 44 = 36 -1(b)
       from eq (a) (100 0 1009 100
        efficient = 0, 9=2 211 and 50
        The points A(x1y) = (012)
     50 100 60 PUT 14:0, x=3
  the pornts B (14) = (3,0)
      from eq (b)
  helson to Put x=0, y=9112001 con 11.
      The pornts c (714) = (019)
          Put y=0 n=4 ng lantigo on
          The points 0 (1410)
       we need to draw the graph for above
```

Points



Put 9=0, 7=4 The popoles p(114) = (410) we draw the graph of above point. feasible region ABCD & bounded feasible sol A, B, CD we find optimum soln of equ M=6x+3y at A (0,2) = M = 6(0) + 3(2)=6 at B (3.0) = M = 6(3) + 3(0)=18/10 - C XM at c (0,9), M = 6(0)+3(9)=27 at D (4,0), M = 6(4) +3(0) = 29 .. The optimum soln Marz=27 at cloa) . It has ounique soll, show solve L.P.P by Graphecally Man Z = 13x+12y : thease Here may the 471 +84 Z32 (s) feasible, gregion & inbounter 6x + 5y I 30 -10 0 - 10 great ble soln 20, (920A et 1907 soit Girven MPD = = 13x + 12y 2/07999 SATE 471 +84 132 (d) po (10)

6x+59230-80-1-101 (1200 gzo etatog salt

9

The standard form of LPP.

MPn2 = 13n+12y

4n+8y=32 -2(a)

6n+5y=30-2(b)

From eq(a)

.put x=0; y=4. The points A(x,y)=(0,4)put y=0, x=8. The points B(x,y)=(8,0)

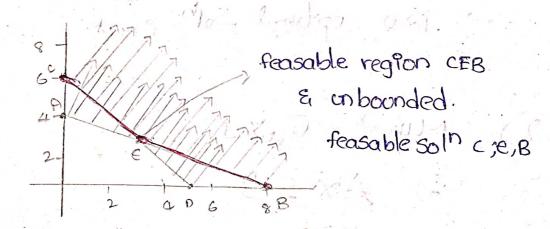
from eq (b)

Put 4=0, 4=6

The pornts c (14)= (016)

Put 4=0, 4=5

we draw the graph of above points.



The entensect poent E: In eq (b) E(b)

471+84=32

at e (114) = (20 18)

the optimum soln of eq (1) M = 13x+12y

at c(0.16), M = 13(0) + 12(6) = 12at $e(29, \frac{18}{9})$, $M = 13(29) + 12(\frac{18}{9}) = 68$ at B(8.0), M = 13(8) + 12(0) = 100The optionnal solve of ea(1) man = 68 at $e(29, \frac{18}{9})$:

It has invalue solve.

Note:-1) Man Z= CIXI

AX >B

(equal)

Tealuable region is unobide

Tealuable Solly does

Not enist.

Munt=Cexa Ax SB xzo

in color aldicasi

Jeans regan Su bodd

> fealwh Soin enist [Mint = 0]

> optimal "Som" - emid [Man = ?