Assignment 3
Ans 1) Maximize Z = 3n, +2n2+n3
subject to the consteraint
(i) 2n,+ 5n2+n3=12 (ii) 3n,+4n2=11
n2, x370, n, unrestricted
Since x, is unrestructed, x = x - n, where x, >0
and n,+710
TATAL STRUCTURE STANDED BEING BEING BEING
Equation four for singlen method
THE THREE RESIDENCE
Maninize z = 3(n,-n,+) +2n2+n3-MR,-MR2
ou z = 3n; +2nz+nz-MR,-MR,-3n;
ou z-3 x -2x2-x3+MR,+MR2+3n,+=0
subjected to
(i) $2(n_i^-n_i^+) + 5n_2 + n_3 + R_1 = 12$
ou 2n + 5n 2 + n 3 + R 1 - 2n + = 12
(ii) $3(x_1^{-} - x_1^{+}) + 4x_2 + R_2 = 11$
or 3n=+4n2+R2-3n,+=11
The Thompson of the State of th
such that ni, nt, n2, n3, R1, R2 70
0 0 0 0 11

Ans 2) (a) Maximize $Z = 5n_1 + 3n_2$ subject to (i) $n_1 + n_2 \le 2$
subject to (i) n1+n2 Sa
(ii) 5n,+2n2 ≤ 10
$(ii) 3x_1 + 8x_2 \le 12 x_1, x_2 > 0$
Linden Method
Limplen Method constraints: $n_1 + n_2 + S_1 = 2$
$5n_1 + 2n_2 + 5_2 = 10$
3n,+8x2+53=12 x1,x2,51,52,53/
Manininge 2=5n,+3n2+0.5, +0.52+0.53
$7 - 5 \pi - 3 \pi = 0$
$Z-5n,-3n_2=0$ $n=5$, $m=3$ Basic Variable = $\{5_1,5_2,5_3\}$
nos, we s pare various control
T.'L' I I T.II.
Initial Suinglen Table
8 2 1 2 3 5 5 5 5 5 5 5 Solution Ratio
21 -5 -3 0 0 0
52 0 5 2 0 1 0 10 2
53 0 5 0 0 0 0 0 1 0 0 1 0 4
Entering variable = n, leaving variable = S1, Privot element
1st Iteration
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53 0 0 5 -3 0 1 6

No enteury variable left										
$n_1=2$, $n_2=0$, $z=5n_1+3n_2=10$ \leftarrow Optimum folution										
Since there was a tie in eratio when rehosing deciding variable, this is a case of degeneracy.										
The constraint $5n_1 + 2n_2 \le 10$ is redundant.										
(b) Manimize $z = 6n_1 + 3n_2$ subject to (i) $2n_1 + n_2 \le 8$										
subject to (i) 2n1+n2 < 8										
(ii) 3n,+3n, ≤18										
$(iii) n_2 \leq 3 \qquad , n_1, n_2 7/0$										
Singlen Mothod Constraint: 2n, +n, +s, =8										
Constraint: 2n, +n, +s, =8										
$3\chi_1 + 3\chi_2 + 5z = 18$										
2+53=3, x1, x2,51,52,537,0										
Maninize										
Z=6n,+3n2+0.5,+0.5,+0.53										
2-67,-37,20										
n=5, m=3. Basic Valuable = 15, 52,53}										
Initial Sumplen Table										
Basic 2 n. n. S. S. S. Solution Ratio										
2 1 -6 -3 0 0 0										
SI 0 2 1 1 0 0 8 4										
52 0 3 3 0 1 6 18 6										
53 0 0 1 0 0 1 3 3/0										
Entering variable = 1, leaving variable = 5, Priot element = 2										

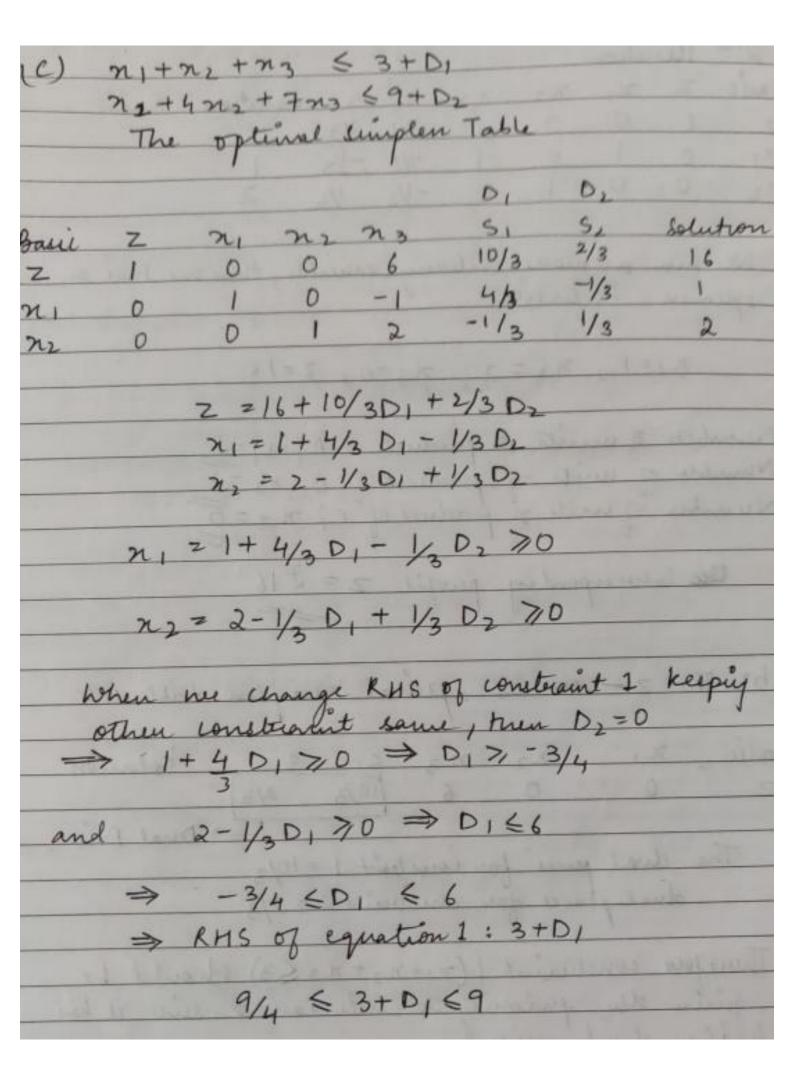
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				221-	370 +	5,=6	×1, 2,51	152710
		100				,		

Z=-2n, +3x2+0.5, +0.52 Manimize 2+2n,-3n,=0 n= 4, m= 2 possic Variable = 51,52 Initial Timplen Table SI Sz Solution Ratio 1 0 5 5/0 52 0 All constraint coefficients under x, are either O or negative, meaning no leaving variable and that xz can be increased infinitely without molating any constraint. Thus, this is a case of unbounded solution. (d) Manininge z = 2n1 + 3 n2 subject to (i) x1-n2 7/4 (li) n1+n2 <6 (iii) n1 52 , x1, n2 70 Sumplen Method Constraint: x,-n,-s,+R1=4 n, + n, +5, = 6 ス1+53=2 , ス112/51/52/53/Ri>O

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Ans 3) Maninize, z = 4n1+6n2+2n3									
subject to du constinints									
11121+22+23									
(i) n+4x2+7x3 < 9, x1, x2, x37,0									
where x1, n2, n3 = number of units produced of A, B and									
C, respectively.									
· · · · · · · · · · · · · · · · · · ·									
(a) Simplen Method: Consterente $n_1 + n_2 + n_3 + S_1 = 3$									
$\frac{1}{1+n_1+n_2} = \frac{1}{1+n_2} = \frac{1}{1+n_2$									
n,+4n, +7n,+52=9, n,1n,2 m3, 51,5270									
Manimine Z = 4n,+6n2+2n3+0.51+0.52									
-> z-4 n1-6 n2 -2 n3=0 Brasic Variable 251,52	_								
MATERIAL STATES									
Initial Simplen Table									
Basie Z N1/ N2/ N3 S1 S2 solution Ratio									
Z 1 -4 -6 -2 0 0 0									
51-0111033									
Initial Simplen Table Basie 7 1/21/23 51 52 Solution Ratio Z 1 -4 -6 -2 0 0 0 S1 0 1 1 1 1 0 3 3 S2 0 1 4 7 0 1 9 9/4									
Entering Variable = n2, leaving variable = SL, Priot element =4									
J mc = 4 = 1 = 1 = 4 = 1 = 4 = 1									
1st Iterations									
Basic Z n1 n2 n3 SI SZ solution hatro									
Z 1 -5/2 0 17/2 0 3/2 27/2									
51 0 3/4 0 -3/4 1 -1/4 3/4 1									
n2 0 1/4 1 7/4 0 1/4 9/4 9									
Entury variable = x, leaving variable = 61, Privot element = 3/4									
and the second s									

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Basic	n	4	262	n	2	5138	S 2	Solution
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Minimum Value of RMS of constraint 1 = 9/4

Manimum value of RMS of constraint 1 = 9

Range = 9-9 = 27

4 for which dual perize of the pereferred constraint ueman came. (d) Maninize z = (4+d1) n, + (6+d2) n 3+ (2+d3) n3 optival Sunglen Table

de de de de de o Basic x1 n2 x3 S1 S2 solution

1 Z 0 0 6 10/3 2/5 16

d1 n1 1 0 -1 4/2 -1/2 1

d2 n2 0 1 2 -1/3 1/3 2 Fedured cost for n3 = 6-d1 + 2d2 + d3 7,0 Reduced cost for S1 = 10 + 4 d1 - 1 d2 7,0 Reduced cost for Cz = 2 - 1 d, + 1 dz >0 Set d, =d, =0 → 6-d370 → d3 < 6 - ∞ < d3 ≤ 6 ⇒ - 0 < 2 + d3 ≤ 8 the erange of perojet contention of peroduct c in the objection function is (-0, 8) given perojet contribution of A and B nervor is well a selection contribution of A and B nervain unchanged.

 $d_2 = d_3 = 0$ $6-d_1>0 \Rightarrow d_1 \leq 6$ $10 + 4 d_1>0 \Rightarrow d_1 \geq -5/2$ 2 - 1 d, 70 => d, 52 -5/2 6 d, 5 2 3/2 ≤ 4+d, ≤6

The erange of perofet of contention of product A in the objective function is [3/2, 6], given profit contribution of B and C runain unchanged.