

## SIMPLEX METHOD-2

e min cTx n variables Coniginal

st. Ax < b m constraints

x > 0

constraints are modified exith additional slack variables to obtain:

Ax = b

A: m x (m+n)

• basic feasible solution (BFS) by solving

Bx = b B: mxm BFS is vertex (corner

· iterate j enters and I exists from the basic variable.

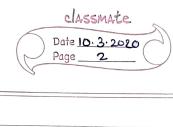
• let j be the entering variable and I be the existing variable. do dj = 1,

di = 0 bor i not in basic variable set

 $AX_{new} = A(x + 0d) = Ax = b \Rightarrow Ad = 0$   $\sum_{i=1}^{m} d_{B(i)} A_{B(i)} + A_{j} = 0$ 

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> BdB + Aj = 0, > dB = -B-1A;



SIMPLEX ALGORITHM

· new = xo Id + 0 \* d

· dj = 1; dg = - B-1 A;

· 0 = min S- xi

· which j to pick? for a given variable j, difference in cost due to ith variable being basic is:

Code + c; = c; - Co B A; we do for each ; and select:

c = | C1, C2, ... Cn |

where G = C - CBBTA

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· Compute the reduced costs

cj = cj - Cp B'A for all nonbasic indices j. if they are all non-negative. the current basic feasible soln is optimal, and the algorithm terminates; else choose some; for which

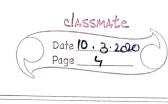
B'B=I= [e, ez...em]

and associated solution x.

1. we start with a basis

2. compute the reduced cost 
$$C_j = C_j - C_B^T \bar{B}^T A_j$$

bor each non-basic variable  $j$  if they are all positive, current solution is optimal, so exit else choose  $j$  such that  $C_j$  to



3. compute u = BTA; if no component of vi positive, we have  $\Theta^* = \infty$  and optimal cost = -00.

1. if for some computation, ui is positive then, O\* = min (ABC)/vi) dual

EXAMPLE 1

min - x - x2 G. - x1 + x2 + x3 = 1 x1 + x4 = 3 162 + Xz = 2 xi > 0