

3 February, 2021

LPP Model abready there from which we convert to dual -> Primal

Matrin Form for LP Model & Dual.

$$B = \begin{bmatrix} b_1 \\ 1 \end{bmatrix} \qquad \begin{bmatrix} c_1 \\ 1 \end{bmatrix} \qquad \begin{bmatrix} n_2 \\ n_2 \end{bmatrix} \qquad \begin{bmatrix} y_1 \\ y_2 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \qquad \begin{bmatrix} c_1 \\ c_1 \end{bmatrix} \qquad \begin{bmatrix} n_1 \\ n_2 \end{bmatrix} \qquad \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix}$$

Primal Model:

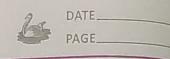
man $7 = Cm + C2n_2 + -- + Cnn_n$ $= C \times$ subject to $An \le b$, $\times > 0$

Dual: Min Z = b. y Subject to

AT. y > C y>0

Mry for min in primal.

To Convert any LP in man form. If min given then convert it into man by multiplying - 1 in objective for. (2) 7/ Can be changed to 5 by multiplying (-1) - In Simplen we again convert the Equis so that b>10 X>7 X Y and -X Y -X Y - X Y - Y If we find the dual of a dual we get brimal En. man Z = 6n1 + h2 + 4n3 subject to 3n1 +7 n2 + n3 515 ni -2 n2 + 3n3 = 20 -> = sign convert in hi 710-Phinal: Sola man Z = 6n, +n2+4n3 Subject to 3n1+7n2+n3515 n1 - 7n2 + 3n3 520 -n1 + 2n2 -3n3 <-20 nino



Dual: Min 7 = 154, + 2042 + -2043 subject to 3y1+y2-y3 7,6 7y1-2y2+2y3 7,1 741 - 242 + 243 71 4 41 + 342 - 343 714) yi>0 In all the 3 egrs there is y2-43 so me com défine a nuo variable 94 94 = 42-43 but we don't know anything about Is (whether Us the or - he) So, yy is unrestricted man Z Min 7 = 15y, +20yy Subject to 34, +44 > 6 7y1 > 2y4 >11 41 + 344 74 41, 42,43 >10 by is unrestricted Pual Min Man i'm Vansable Non-negati ne van ith variable is unrestricted th non nog. (71) (onst. Ith unrestricted \$thi Constraint ()

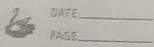
Min Z = n1 -2n2 +3n3 En-Subject to

4n1 + Sn2 - 6ng = 7 7 convert who 8 n, - 9m2 +10m3 511 J >= m, no 7/0 ms is unrestricted 501" Min Z = n, -2n2 + 3n3 Subject to 4n, +5n2 -6n3 =7 -91 unristados -8 n1 +9n2 -10n3 > -11 -> y2 non-neg. ni,n27,0 nz is unestricted Dual: Man Z = Ty 1-11/2 subject to Gy1-892# <1 59, + 9y2 5-2 -691 - 1093 = 3y is unrestricted, y 27/0 Mon Z = (n)Subject to $An \le b$ Subject to $A^T y \ge c$ n > 10The subject to y > 10Thom 1: If xo is a feasible solr of Iman) then (no 5 b. Vo Loney frasible not

oftimum



Proof:
We have Ano & b, X0>0 >, Ano 1 u >b AT yo >, C, Yo >, O => ATyo-V=C V = ATYOIC >0 b = Ano + (1 -(3) RHS b. yo = yotb = YoT (Ano fu) = YoT Ano + YoTu This is a single value (Yo is Column A 15 Matrin no 's Row) i. WP can take its transpase = (YoTAno)T + YoTu = Yo' U + XoT (ATYO) = You + XoT (V+c) = You + xot v + xot c = You + you + no. G 6% 3 6.40 7/ XOC



PAGE
b. xo - xo.c = You + xo.v
Theorm 2: If Z (man) is not bounded above, then (min) is not fearible
above then (min) is not leaville
11 = 1
My If Z (min) is not bounded below them (man) is not fasible.
them (man) is not farible.
4 - 7 -