

## Paretivenessis Sierricidia Grappia

# A. P. SHAH INSTITUTED OF THEOLOGY

(Approved by AICTE New Delhi & Govt. of Maharashtra, Affiliated to University of Mumbai) (Religious Jain Minority)

Subject: Applied Mathematics IV

SEM:IV

Penalty (Big-M or charne's) Method: -

It any one or some of the wonstraints are of greater than or equal type to convert the inequality to equality we have to subtract the surplus variables &) -S,,-S&,... But we would not get a unit matrix. To overcome this difficulty in addition to surplus variables we introduce artificial variables AriAz,... with the sign to the constraints. In the objective function we assign big penalty by Subtracting MAI, MADI... Pb the objective function of maximisation type

Remark!
\* The artificial variable leave the process and

the optimality condition is satisfied by the basic

Variables.



### Variationali Similarita Barres

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\* Afleast one of the artificial variables remains in the basis with zero value and the optimality condition is satisfied. This the optimal basic feasible solution.

\* Afleast one of the artificial variables remains in the basis with non-zero value and the optimality condition is satisfied. This is not an optimal condition since it contains large penalty M. Solution since it contains large penalty M. This is not a solution but a pseudo-solution.

Ousing Penalty (Big-M) method solve the tollowing

LPP Maximise  $Z = 3\pi 1 - \pi 2$ Subject to  $3\pi 1 + 3\pi 2 = 2$   $3\pi 1 + 3\pi 2 = 3$   $4 \le 2\pi$   $4 \le 2\pi$   $5\pi 1 = 2\pi$   $5\pi 1 = 2\pi$ 

Soln: Since the second constraint is 2' type we introduce Artificial variable A2 and 679

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penalty in the objective function.

Maximire Z=3x1-x2-05,-05-053-MA2 >0

@ - & 0+620+620+12+ar+1,46 of tropplus

11+312+081-52+083 +A2=3 -> 3

· @ ← A-CAO+ 52+ 20+120+ CK+110

71112, S1152, AD 20

We eliminate MAD from the objective function

by additing Mx2 constraint to it.

0+0M=>z=(3+M)n,-U-3M)no-0s,-MS

-052-0A2-3M.

ME-= GAO+ E20+ G2M+ 120+GK (ME-1)+1K (M+E)-5

Simplex table co-effes of 2HG Meration Basic Ratio al als AZ n, n2 S, S2 S3 Var.

-3M MO 0 -3-M F3M 0 0

S1 An leaves na enters A 2

2 3\* 1

0 0

2 2/152 3 3/3:1/6

0 0 1 Sz 0 0

**Prof. Nancy Nimal** 

Department of Humanities and Applied Sciences



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| t ,       | Z     | -10/3 | 0   | 0   | 1/3  | 0   | _            | -1      |
|-----------|-------|-------|-----|-----|------|-----|--------------|---------|
| S, leaves | 12    | 5/3*  | 0   | 1   | 1/3  | D   | _            | 1 815 € |
| a, enlers |       | 1/3   | 1   | 0   | -1/3 | 0   | -            | 1 3     |
|           | S3    | 1/3   | , 0 | 0   | 1/3  |     |              | 3 -9    |
|           |       | 11.   | 4   |     |      |     | -            | . 1     |
| 2         | Z     | 0     | 0   | Q   | t    |     |              |         |
|           | NI    | . 1   | 0   | 3,  | 15 1 | 2 0 | 6-           | 3/5     |
|           | na    | 0     | 1   | -11 | 5 -2 | 60  | <del>-</del> | 4/5-    |
|           | $S_3$ | 0     | 0   | ۲)  | 5 2  | 15  | 1 -          | 16/5    |

2) Using the penalty (Big M) method solve the following LPP maximise  $Z = 8\pi i + 2\pi 2$ Subject to  $2\pi i + 2\pi 2 = 8\pi i + 2\pi 2$   $8\pi i + 4\pi 2 = 12$ 

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# And the second s

### Parahvanadi Shartable Brooks

# A P. SIVALI INSIMPLIND OF PROPERTOLOGY

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2010's Maximise Z= 31, 4210-08, -08, -08 -MA2 -> 17 Bubject to 07, 475 + 8, +050 +0A2 = 2 -> (2) 37, +Ano +OS, -So +Ao=12 -> 3 -Eliminate M in O by 3xM+0 : Z=(3+3M)n,+(2+4M)n2-08,-M&-0A2=12M 1. Z-(3+3M) n, -(2+4M) n2+0S1+MS2+0A2=-12M Simplex table co-effts of Iteration Basic Ratio Variables X, X2 S, S2 no 12M Z -2-3M -2-4M 2  $\mathcal{Q}$ 2 Si 3 12 A2 4 .3 0 4-4M M 244M 1 145M Z 0 X 2 2 H -4 -1 **Prof. Nancy Nimal Department of Humanities and Applied Sciences** 



### Sarchivaneshi (Charifelia): (Garafe)

## A P SHARI INSHHHUHD OD THOCHNOLOGY

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Since the artificial variable As appears not at zero level and all entires in the vow of z have M with positive co-efficient, beasible solution does not exist the solution is colled pseudo-optimum basic feasible solution.