**Kasus Minimisasi**

**Contoh Kasus**

1. Fungsi Tujuan

Minimumkan : Z = 40 X1 + 20 X2

1. Fungsi Pembatas

|  |  |  |
| --- | --- | --- |
| 3 X1 | + | X2 27 |
| X1 | + | X2 21 |
| X1 | + 2 X2 30 | |

Syarat non negative : X1, X2 0

20

Model Simpleks

1. Fungsi Tujuan : Z = 40 X1 + 20 X2 + 0 S1 + 0 S2 + 0 S3 Z - 40 X1 - 20 X2 - 0 S1 - 0 S2 - 0 S3 = 0
2. Fungsi Pembatas :

3 X1 + X2 – S1 = 27 X1 + X2 – S2 = 21 X1 + 2 X2 – S3 = 30

Syarat non negative ; X1, X2, S1, S2, S3 0

Pada solusi awal, yaitu : X1 = X2 = 0, Maka : S1 = - 27 ; S2 = -21 ; S3 = -30.

S1, S2, S3 harus non negative. Untuk itu perlu ditambah variable buatan (artificial variable) sebesar A, maka fungsi pembatas menjadi :

3 X1 + X2 – S1 + A1 = 27

X1 + X2 – S2 + A2 = 21

X1 + 2 X2 – S3 + A3 = 30

Syarat non negative : X1, X2, S1, S2, S3, A1, A2, A3 0.

Untuk fungsi tujuan diberi nilai M positif, sehingga fungsi tujuan menjadi:

Z - 40 X1 - 20 X2 - 0 S1 - 0 S2 - 0 S3 – MA1 – MA2 – MA3 = 0

Ada dua metode penyelesaian persoalan metode simpleks kasus minimisasi, yaitu :

A. Metode M (metode Penalti)

B. Metode dua tahap

A. Metode M (metode penalty)

1. Fungsi Tujuan

Minimumkan : Z = 40 X1 + 20 X2

1. Fungsi Pembatas

|  |  |  |
| --- | --- | --- |
| 3 X1 | + | X2 27 |
| X1 | + | X2 21 |
| X1 | + 2 X2 30 | |

Syarat non negative : X1, X2 0

Metode Simpleks

3 X1 + X2 – S1 + A1 = 27

A1 = 27 – 3 X1 – X2 + S1

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X1 + X2 – S2 + A2 = 21

A2 = 21 – X1 – X2 + S2

X1 + 2 X2 – S3 + A3 = 30

A3 = 30 – X1 – 2 X2 + S3

Substitusikan ke dalam fungsi tujuan

Z - 40 X1 - 20 X2 - 0 S1 - 0 S2 - 0 S3 – MA1 – MA2 – MA3 = 0

Z - 40 X1 - 20 X2 – M(27 – 3 X1 – X2 + S1) – M(21 – X1 – X2 + S2) – M(30 – X1 – 2 X2 + S3) = 0

Z - 40 X1 - 20 X2 – 27 M + 3 MX1 + MX2 – MS1 – 21 M + MX1 + MX2 – MS2 – 30 M + MX1 + 2 MX2 – MS 3 = 0

Z – 40 X1 – 20 X2 – 78 M + 5 MX1 + 4 MX2 – MS1 – MS2 – MS3 = 0

Z – 40 X1 + 5 MX1 – 20 X2 + 4 MX2 - MS1 – MS2 – MS3 = 78 M

* 1. – (40 – 5M)X1 – (20 – 4M)X2 - MS1 – MS2 – MS3 = 78 M Perubahan bentuk model simpleks kasus minimisasi:

1. Fungsi tujuan :
   1. – (40 – 5M)X1 – (20 – 4M)X2 - MS1 – MS2 – MS3 = 78 M
2. Fungsi Pembatas

3 X1 + X2 – S1 + A1 = 27 X1 + X2 – S2 + A2 = 21 X1 + 2 X2 – S3 + A3 = 30

Syarat non negative : X1, X2, S1, S2, S3, A1, A2, A3 0.

Tabel Simpleks :

Solusi awal kasus minimisasi metode M

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variabel** | **X1** | **X2** | **S1** | **S2** | **S3** | **A1** | **A2** | **A3** | **NK** |
| **Dasar** |  |  |  |  |  |  |  |  |  |
| Z | -(40 – 5M) | -(20 – 4M) | - M | -M | -M | 0 | 0 | 0 | 78 M |
|  |  |  |  |  |  |  |  |  |  |
| A1 | 3 | 1 | -1 | 0 | 0 | 1 | 0 | 0 | 27 |
|  |  |  |  |  |  |  |  |  |  |
| A2 | 1 | 1 | 0 | -1 | 0 | 0 | -1 | 0 | 21 |
|  |  |  |  |  |  |  |  |  |  |
| A3 | 1 | 2 | 0 | 0 | -1 | 0 | 0 | 1 | 30 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  | 22 |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variabel** | **X1** | **X2** | **S1** | **S2** | **S3** | **A1** | **A2** | **A3** | **NK** |
| **Dasar** |  |  |  |  |  |  |  |  |  |
| Z | **- 40 + 5M** | -20 + 4M | - M | -M | -M | 0 | 0 | 0 | 78 M |
|  |  |  |  |  |  |  |  |  |  |
| A1 | 3 | 1 | -1 | 0 | 0 | 1 | 0 | 0 | 27 |
|  |  |  |  |  |  |  |  |  |  |
| A2 | 1 | 1 | 0 | -1 | 0 | 0 | -1 | 0 | 21 |
|  |  |  |  |  |  |  |  |  |  |
| A3 | 1 | 2 | 0 | 0 | -1 | 0 | 0 | 1 | 30 |
|  |  |  |  |  |  |  |  |  |  |

Iterasi-1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variabel** | **X1** | **X2** | **S1** | **S2** | **S3** | **A1** | **A2** | **A3** | **NK** | **Indeks** |
| **Dasar** |  |  |  |  |  |  |  |  |  |  |
| Z | - 40 + 5M | -20 + 4M | - M | -M | -M | 0 | 0 | 0 | 78 M | - |
|  |  |  |  |  |  |  |  |  |  |  |
| A1 | **3** | 1 | -1 | 0 | 0 | 1 | 0 | 0 | 27 | 9 |
|  |  |  |  |  |  |  |  |  |  |  |
| A2 | 1 | 1 | 0 | -1 | 0 | 0 | -1 | 0 | 21 | 21 |
|  |  |  |  |  |  |  |  |  |  |  |
| A3 | 1 | 2 | 0 | 0 | -1 | 0 | 0 | 1 | 30 | 30 |
|  |  |  |  |  |  |  |  |  |  |  |

Indeks terkecil = 9, pada baris A1, jd angka kunci = 3

Variabel dasar baru X1, ganti baris A1 dengan :

Kolom X1 = 3/3 = 1

Kolom X2 = 1/3

Kolom S1 = -1/3

Kolom S2 = 0/3 = 0

Kolom S3 = 0/3 = 0

Kolom A1 = 1/3

Kolom A2 = 0/3 = 0

Kolom A3 = 0/3 = 0

Kolom NK = 27/3 = 9

Ganti baris Z

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| ----------------------------------------------------------------------------------- | | | | | | | | |
| -40 + 5 M -20 + 4 M - M -M -M0 | | | | | 0 | 0 | 78 M |  |
| 1 | 1/3 | -1/3 0 | 0 | 1/3 | 0 | 0 | 9 | x (-40 + 5 M) |

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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | X1 |  |  |  | X2 | |  |  |  | S1 |  | S2 S3 | |  | A1 | | A2 A3 | | | | NK | |  |  |  |  |
| -------------------------------------------------------------------------------------------------- | | | | | | | | | | | | | | | | | | | | | | | | |  |  |
|  | -40 + 5 M -20 + 4 M | | | | | | | - M | | | -M -M | | |  | 0 |  |  | 0 0 | | | 78 M | |  |  |  |  |
|  | - 40 + 5 M -40/3 + 5/3 M 40/3 – 5/3 M 0 0 -40/3 + 5/3 M | | | | | | | | | | | | | | | | | 0 |  | 0 -360 + 45 M | | | | | |  |
| ------------------------------------------------------------------------------------------------ - | | | | | | | | | | | | | | | | | | | | | | | | |  |  |
| 0 | |  | -20/3 + 7/3 M -40/3 + 2/3 M -M -M 40/3 – 5/3 M 0 | | | | | | | | | | | | | | | | | 0 360 + 33 M | | | | | |  |
|  | Baris A2 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X1 X2 | | |  | S1 | | S2 | S3 |  | A1 |  | A2 | | A3 | NK | |  |  |  |  |  |  |  |  |  |  |
| ------------------------------------------------------------------ | | | | | | | | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |
| 1 | | 1 |  | 0 | |  | -1 | 0 | 0 | | -1 | |  | 0 | 21 |  |  |  |  |  |  |  |  |  |  |  |
| 1 | | 1/3 | | -1/3 | | | 0 | 0 | 1/3 | | 0 | |  | 0 | 9 |  | x (1) | | | - |  |  |  |  |  |  |
| 0-------------------------------------------------------------------------- | | 2/3 | | 1/3 | | | -1 | 0 | -1/3 | | -1 | |  | 0 | 12 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | Baris A3 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X1 X2 | | |  | S1 | | S2 | S3 |  | A1 |  | A2 | | A3 | NK | |  |  |  |  |  |  |  |  |  |  |
| ------------------------------------------------------------------ | | | | | | | | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |
| 1 | | 2 |  | 0 | |  | 0 | -1 | 0 | | 0 | |  | 1 | 30 |  |  |  |  |  |  |  |  |  |  |  |
| 1 | | 1/3 | | -1/3 | | | 0 | 0 | 1/3 | | 0 | |  | 0 | 9 |  | x (1) | | | - |  |  |  |  |  |  |
| 0-------------------------------------------------------------------------- | | 5/3 | | 1/3 | | | 0 | -1 | -1/3 | | 0 | |  | 1 | 21 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
|  | Variabel | |  | X1 | |  | X2 |  |  | S1 | | |  | S2 | S3 |  |  | A1 | | |  | A2 |  | A3 |  | NK |
|  | Dasar | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Z |  |  | 0 | |  | **-20/3 + 7/3 M** | |  | -40/3 + 2/3 M | | |  | - M | - M |  | 40/3 – 5/3 M | | | |  | 0 |  | 0 | 360 + 33 M | |
|  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
|  | X1 |  |  | 1 | |  | 1/3 |  |  | -1/3 | | |  | 0 | 0 |  |  | 1/3 | | |  | 0 |  | 0 |  | 9 |
|  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
|  | A2 |  |  | 0 | |  | 2/3 |  |  | 1/3 | | |  | -1 | 0 |  |  | -1/3 | | |  | 1 |  | 0 |  | 12 |
|  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
|  | A3 |  |  | 0 | |  | 5/3 |  |  | 1/3 | | |  | 0 | -1 |  |  | -1/3 | | |  | 0 |  | 1 |  | 21 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Iterasi-2 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Variabel | | X1 | |  |  |  | X2 |  |  | S1 |  | S2 |  | S3 | A1 | |  |  |  | A2 |  | A3 |  | NK | | Indeks |
| Dasar | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Z | 0 | |  | **-20/3 + 7/3 M** | | | -40/3 + 2/3 M | | |  | - M |  | - M | 40/3 – 5/3 M | | |  |  | 0 | 0 | | 360 + 33 M | | | - |
|  |  |  | |  |  |  |  |  |  | |  |  |  |  |  | | |  |  |  |  | |  | |  |  |
|  | X1 | 1 | |  |  |  | 1/3 |  | -1/3 | |  | 0 |  | 0 | 1/3 | | |  |  | 0 | 0 | | 9 | |  | 27 |
|  |  |  | |  |  |  |  |  |  | |  |  |  |  |  | | |  |  |  |  | |  | |  |  |
|  | A2 | 0 | |  |  |  | 2/3 |  | 1/3 | |  | -1 |  | 0 | -1/3 | | |  |  | 1 | 0 | | 12 | |  | 18 |
|  |  |  | |  |  |  |  |  |  | |  |  |  |  |  | | |  |  |  |  | |  | |  |  |
|  | A3 | 0 | |  |  |  | **5/3** |  | 1/3 | |  | 0 |  | -1 | -1/3 | | |  |  | 0 | 1 | | 21 | |  | 63/5 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Indeks terkecil 63/5 pada baris A3, jd angka kunci = 5/3

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Variabel dasar baru X2, ganti baris A3 dengan :

Kolom X1 = 0/(5/3) = 0

Kolom X2 = (5/3)/(5/3) = 1

Kolom S1 = (1/3)/(5/3) = 1/5

Kolom S2 = 0/(5/3) = 0

Kolom S3 = -1/(5/3) = -3/5

Kolom A1 = -(1/3)/(5/3) = - 1/5

Kolom A2 = 0/(5/3) = 0

Kolom A3 = 1/(5/3) = 3/5

Kolom NK = 21/(5/3) = 63/5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Baris Z |  |  |  |  |  |
| X1 | X2 | S1 | S2S3 | A1 | A2A3NK |

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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | -20/3 + 7/3 M | -40/3 + 2/3 M -M | | -M | 40/3 – 5/3 M | 0 | 0 | 360 + 33 M |
| 0 | 1 | 1/5 | 0 | -3/5 | -1/5 | 0 | 3/5 | 63/5 x (-20/3 + 7/3 M) |

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X1 X2 S1 S2 S3 A1 A2 A3 NK

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | -20/3 + 7/3 M | -40/3 + 2/3 | M -M | -M40/3 – 5/3 M 0 | 0 | 360 + 33 M |
| 0 | -20/3 + 7/3 M | -4/3 + 7/15 | M 0 | 4 – 7/5 M 4/3 – 7/15 M 0 | -4 + 7/5 M -84 + 147/5 | |

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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | - 12 + 1/5 M | | -M -4 + 2/5 M 12 - 6/5 M 0 4 – 7/5 M 444 + 18/5 M | | | | |
| Baris X1 | |  |  |  |  |  |  |  |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| ---------------------------------------------------------------------------------- | | | | | | | | |
| 1 | 1/3 | -1/3 | 0 | 0 | 1/3 | 0 | 0 | 9 |
| 0 | 1 | 1/5 | 0 | -3/5 | -1/5 | 0 | 3/5 | 63/5 x (1/3) |
| ---------------------------------------------------------------------------------- | |  |  |  |  |  |  | - |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| ---------------------------------------------------------------------------------- | | | | | | | | |
| 1 | 1/3 | -1/3 | 0 | 0 | 1/3 | 0 | 0 | 9 |
| 0 | 1/3 | 1/15 | 0 | -1/5 | -1/15 | 0 | 1/5 | 21/5 |
| ---------------------------------------------------------------------------------- | |  |  |  |  |  |  | - |
| 1 | 0 | -2/5 | 0 | 1/5 | 2/5 | 0 | -1/5 | 24/5 |
| Baris A2 | |  |  |  |  |  |  |  |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| ---------------------------------------------------------------------------------- | | | | | | | | |
| 0 | 2/3 | 1/3 | -1 | 0 | -1/3 | 1 | 0 | 12 |
| 0 | 1 | 1/5 | 0 | -3/5 | -1/5 | 0 | 3/5 | 63/5 x (2/3) |
| ---------------------------------------------------------------------------------- | |  |  |  |  |  |  | - |

25

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X1 | X2 | |  | S1 | | | S2 | |  | S3 | A1 | |  | A2 | | | A3 | | NK | |  |  |  |  |  |  |  |
| ---------------------------------------------------------------------------------- | | | | | | | | | | | | | | | | | | | | | | |  |  |  |  |  |
| 0 | 2/3 | | 1/3 | | | | -1 | | 0 | | -1/3 | |  |  | 1 | | 0 | | 12 | |  |  |  |  |  |  |  |
| ----------------------------------------------------------------------------------0 | 2/3 | | 2/15 0 | | | | | | -2/5 | | -2/15 | | |  | 0 | | 2/5 | | 42/5 | | - | | | |  |  |  |
| 0 | 0 |  | 1/5 | | | | -1 | | 2/5 | | -1/5 | | |  | 1 | | -2/5 | | 18/5 | |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Variabel | |  | X1 | |  | X2 | |  |  | S1 | S2 | |  |  |  | S3 |  |  | A1 | |  | A2 |  |  | A3 | | NK |
|  | Dasar |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Z |  | 0 | |  |  | **0** |  | -12 + 1/5 M | | -M | | **-4 + 2/5 M** | | | | |  | 12 – 6/5 M | |  | 0 |  | 4 – 7/5 M | | | 444 + 18/5 M |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X1 |  | 1 | |  |  | 0 |  | -2/5 | | 0 |  |  |  | 1/5 | |  |  | 2/5 | |  | 0 |  | -1/5 | |  | 24/5 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | A2 |  | 0 | |  |  | 0 |  | 1/5 | | -1 |  |  |  | 2/5 | |  |  | -1/5 | |  | 1 |  | -2/5 | |  | 18/5 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X2 |  | 0 | |  |  | 1 |  | 1/5 | | 0 |  |  |  | -3/5 | |  |  | -1/5 | |  | 0 |  | 3/5 | |  | 63/5 |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Iterasi-3 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Variabel | | |  | X1 | |  | X2 | |  | S1 |  |  | S2 | |  |  | S3 | |  |  |  | A1 | |  | A2 |  |  |
|  | Dasar | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Z | | 0 | |  |  | **0** |  | -12 + 1/5 M | | |  | -M | |  | **-4 + 2/5 M** | | | | 12 – 6/5 M | | | |  | 0 |  |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |
|  | X1 | | 1 | |  |  | 0 |  | -2/5 | |  |  | 0 |  |  |  | 1/5 | |  |  | 2/5 | |  |  | 0 |  |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |
|  | A2 | | 0 | |  |  | 0 |  | 1/5 | |  |  | -1 | |  |  | **2/5** | |  |  | -1/5 | |  |  | 1 |  |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |
|  | X2 | | 0 | |  |  | 1 |  | 1/5 | |  |  | 0 |  |  |  | -3/5 | |  |  | -1/5 | |  |  | 0 |  |  |
|  | | |  |  |  |  | | |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | |  |  |  |  | | |  |  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Variabel | | |  |  |  | A3 | | |  | NK | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Dasar | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Z | |  | 4 – 7/5 M | | | | | | 444 + 18/5 M | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | |  |  | | | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X1 | |  | -1/5 | | | |  |  | 24/5 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | |  |  | | | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | A2 | |  | -2/5 | | | |  |  | 18/5 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | |  |  | | | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | X2 | |  | 3/5 | | | |  |  | 63/5 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Indeks terkecil 9 pada baris A2, jd angka kunci = 2/5

Variabel dasar baru S3, ganti baris A2 dengan :

Kolom X1 = 0/(2/5) = 0

Kolom X2 = 0/(2/5) = 0

Kolom S1 = (1/5)/(2/5) = 1/2

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Kolom S2 = -1/(2/5) = -5/2

Kolom S3 = (2/5)/(2/5) = 1

Kolom A1 = -(1/5)/(2/5) = - 1/2

Kolom A2 = 1/(2/5) = 5/2

Kolom A3 = -2/5/(2/5) = -1

Kolom NK = (18/5)/(2/5)) = 9

Baris Z

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X1 X2 | | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| --------------------------------------------------------------------------------------------------- | | | | | | | | |
| 0 | 0 | -12 + 1/5 M | -M -4 + 2/5 M | | 12 – 6/5 M | 0 | 4 – 7/5 M | 444 + 18/5 M |
| 0 | 0 | 1/2 | -5/2 | 1 | -1/2 | 5/2 | -1 | 9 x (-4 + 2/5 M) |

------------------------------------------------------------------------------------------------------------

X1 X2 S1 S2 S3 A 1 A2 A3 NK

--------------------------------------------------------------------------------------------------

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 0 -12 + 1/5 M | | | -M -4 + 2/5 M 12 – 6/5 M | | | | 0 | 4 – 7/5 M 444 + 18/5 M | |
| 0 | 0 -2 + 1/5 M | | 10 - M -4 + 2/5 M 2 – 1/5 M | | | | -10 + M 4 – 2/5 M | | -36 + 18/5 M |
| ----------------------------------------------------------------------------------------------- | |  |  |  |  |  |  |  | - |
| 0 | 0-10 | | -10 | 0 | 10 – M | | 10 – M | - M | 480 |
| Baris X1 | |  |  |  |  |  |  |  |  |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |  |
| ------------------------------------------------------------------------ | | | | | | | | |  |
| 1 | 0 | -2/5 | 0 | 1/5 | 2/5 | 0 | -1/5 | 24/5 |  |
| 0 | 0 | 1/2 | -5/2 | 1 | -1/2 | 5/2 | -1 | 9 x (1/5) | |
| --------------------------------------------------------------------------- | |  |  |  |  |  |  |  | - |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |  |
| ------------------------------------------------------------------------ | | | | | | | | |  |
| 1 | 0 | -2/5 | 0 | 1/5 | 2/5 | 0 | -1/5 | 24/5 |  |
| 0-------------------------------------------------------------------------- | 0 | 1/10 | -1/2 | 1/5 | -1/10 | 1/2 | -1/5 | 9/5 | - |
| 1 | 0 | -1/2 | ½ | 0 | ½ | -1/2 | 0 | 3 |
|  |
| Baris X2 | |  |  |  |  |  |  |  |  |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |  |
| ------------------------------------------------------------------------ | | | | | | | | |  |
| 0 | 1 | 1/5 | 0 | -3/5 | -1/5 | 0 | 3/5 | 63/5 |  |
| 0 | 0 | 1/2 | -5/2 | 1 | -1/2 | 5/2 | -1 | 9 x (-3/5) | |
| --------------------------------------------------------------------------- | |  |  |  |  |  |  |  | - |
| X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |  |
| ------------------------------------------------------------------------ | | | | | | | | |  |
| 0 | 1 | 1/5 | 0 | -3/5 | -1/5 | 0 | 3/5 | 63/5 |  |
| 0 | 0 | -3/10 | 3/2 | -3/5 | 3/10 | -3/2 | 3/5 | -27/5 | - |
| 0----------------------------------------------------------------------- | 1 | ½ | -3/2 | 0 | -1/2 | 3/2 | 0 | 18 |
|  |
|  |  |  |  |  |  | 27 |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variabel | X1 | X2 | S1 | S2 | S3 | A1 | A2 | A3 | NK |
| Dasar |  |  |  |  |  |  |  |  |  |
| Z | 0 | 0 | -10 | -10 | 0 | 10 - M | 10 – M | -M | 480 |
|  |  |  |  |  |  |  |  |  |  |
| X1 | 1 | 0 | - | 1/2 | 0 | 1/2 | -1/2 | 0 | 3 |
|  |  |  | 1/2 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| S3 | 0 | 0 | 1/2 | -5/2 | 1 | -1/2 | 5/2 | -1 | 9 |
|  |  |  |  |  |  |  |  |  |  |
| X2 | 0 | 1 | 1/2 | -3/2 | 0 | -1/2 | 3/2 | 0 | 18 |
|  |  |  |  |  |  |  |  |  |  |

Krn tidak ada lagi M yang positif, maka iterasi selesai di dapat: X1 = 3 ; X2 = 18 ; Z = 480