

Lampiran 1. Langkah Perhitungan untuk Mencari Z^0 Menggunakan Program WinQSB

Memasukkan data

| | OBJ/Constraint/Bound |
|----------------------|------------------------|
| Maximize | $10x_1+15x_2$ |
| C1 | $20x_1+15x_2 \leq 100$ |
| C2 | $3x_1+2.5x_2 \leq 40$ |
| C3 | $5x_1+8x_2 \leq 30$ |
| C4 | $1.5x_1+2x_2 \leq 8$ |
| Integer: | |
| Binary: | |
| Unrestricted: | |
| X1 | $\geq 0, \leq M$ |
| X2 | $\geq 0, \leq M$ |

Solve and Analyze → Solve and Display Steps.

Iterasi 1

Simplex Tableau -- Iteration 1

| | | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | | |
|--------------|------------------|---------|---------|----------|----------|----------|----------|-----------------|--------------|
| Basis | C(j) | 10,0000 | 15,0000 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| Slack_C1 | 0 | 20,0000 | 15,0000 | 1,0000 | 0 | 0 | 0 | 100,0000 | 6,6667 |
| Slack_C2 | 0 | 3,0000 | 2,5000 | 0 | 1,0000 | 0 | 0 | 40,0000 | 16,0000 |
| Slack_C3 | 0 | 5,0000 | 8,0000 | 0 | 0 | 1,0000 | 0 | 30,0000 | 3,7500 |
| Slack_C4 | 0 | 1,5000 | 2,0000 | 0 | 0 | 0 | 1,0000 | 8,0000 | 4,0000 |
| | C(j)-Z(j) | 10,0000 | 15,0000 | 0 | 0 | 0 | 0 | 0 | 0 |

Iterasi 2

Simplex Tableau -- Iteration 2

| | | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | | |
|--------------|------------------|---------|---------|----------|----------|----------|----------|-----------------|--------------|
| Basis | C(j) | 10,0000 | 15,0000 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| Slack_C1 | 0 | 10,6250 | 0 | 1,0000 | 0 | -1,8750 | 0 | 43,7500 | 4,1176 |
| Slack_C2 | 0 | 1,4375 | 0 | 0 | 1,0000 | -0,3125 | 0 | 30,6250 | 21,3043 |
| X2 | 15,0000 | 0,6250 | 1,0000 | 0 | 0 | 0,1250 | 0 | 3,7500 | 6,0000 |
| Slack_C4 | 0 | 0,2500 | 0 | 0 | 0 | -0,2500 | 1,0000 | 0,5000 | 2,0000 |
| | C(j)-Z(j) | 0,6250 | 0 | 0 | 0 | -1,8750 | 0 | 56,2500 | |

Lampiran 1. (Lanjutan)

Iterasi 3

Simplex Tableau -- Iteration 3

| Basis | C(j) | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | R. H. S. | Ratio |
|----------|-----------|--------|--------|----------|----------|----------|----------|----------|-------|
| Slack_C1 | 0 | 0 | 0 | 1,0000 | 0 | 8,7500 | -42,5000 | 22,5000 | |
| Slack_C2 | 0 | 0 | 0 | 0 | 1,0000 | 1,1250 | -5,7500 | 27,7500 | |
| X2 | 15,0000 | 0 | 1,0000 | 0 | 0 | 0,7500 | -2,5000 | 2,5000 | |
| X1 | 10,0000 | 1,0000 | 0 | 0 | 0 | -1,0000 | 4,0000 | 2,0000 | |
| | C(j)-Z(j) | 0 | 0 | 0 | 0 | -1,2500 | -2,5000 | 57,5000 | |



Lampiran 2. Langkah Perhitungan untuk Mencari Z^1 Menggunakan Program WinQSB

Memasukkan data

| | OBJ/Constraint/Bound |
|----------------------|--------------------------|
| Maximize | $10x_1 + 15x_2$ |
| C1 | $20x_1 + 15x_2 \leq 110$ |
| C2 | $3x_1 + 2.5x_2 \leq 44$ |
| C3 | $5x_1 + 8x_2 \leq 33$ |
| C4 | $1.5x_1 + 2x_2 \leq 8.8$ |
| Integer: | |
| Binary: | |
| Unrestricted: | |
| X1 | $>=0, <=M$ |
| X2 | $>=0, <=M$ |

Solve and Analyze → Solve and Display Steps.

Iterasi 1

| | | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | | |
|--------------|------------------|--------|--------|----------|----------|----------|----------|-----------------|--------------|
| Basis | C(j) | 10,000 | 15,000 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| Slack_C1 | 0 | 20,000 | 15,000 | 1,000 | 0 | 0 | 0 | 110,000 | 7,3333 |
| Slack_C2 | 0 | 3,000 | 2,500 | 0 | 1,000 | 0 | 0 | 44,000 | 17,6000 |
| Slack_C3 | 0 | 5,000 | 8,000 | 0 | 0 | 1,000 | 0 | 33,000 | 4,1250 |
| Slack_C4 | 0 | 1,500 | 2,000 | 0 | 0 | 0 | 1,000 | 8,8000 | 4,4000 |
| | C(j)-Z(j) | 10,000 | 15,000 | 0 | 0 | 0 | 0 | 0 | |

Iterasi 2

| | | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | | |
|--------------|------------------|---------|--------|----------|----------|----------|----------|-----------------|--------------|
| Basis | C(j) | 10,000 | 15,000 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| Slack_C1 | 0 | 10,6250 | 0 | 1,000 | 0 | -1,8750 | 0 | 48,1250 | 4,5294 |
| Slack_C2 | 0 | 1,4375 | 0 | 0 | 1,000 | -0,3125 | 0 | 33,6875 | 23,4348 |
| X2 | 15,000 | 0,6250 | 1,000 | 0 | 0 | 0,1250 | 0 | 4,1250 | 6,6000 |
| Slack_C4 | 0 | 0,2500 | 0 | 0 | 0 | -0,2500 | 1,000 | 0,5500 | 2,2000 |
| | C(j)-Z(j) | 0,6250 | 0 | 0 | 0 | -1,8750 | 0 | 61,8750 | |

Lampiran 2. (Lanjutan)

Iterasi 3

Simplex Tableau -- Iteration 3

| | | X1 | X2 | Slack_C1 | Slack_C2 | Slack_C3 | Slack_C4 | | |
|----------|-----------|---------|---------|----------|----------|----------|----------|----------|-------|
| Basis | C(j) | 10,0000 | 15,0000 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| Slack_C1 | 0 | 0 | 0 | 1,0000 | 0 | 8,7500 | -42,5000 | 24,7500 | |
| Slack_C2 | 0 | 0 | 0 | 0 | 1,0000 | 1,1250 | -5,7500 | 30,5250 | |
| X2 | 15,0000 | 0 | 1,0000 | 0 | 0 | 0,7500 | -2,5000 | 2,7500 | |
| X1 | 10,0000 | 1,0000 | 0 | 0 | 0 | -1,0000 | 4,0000 | 2,2000 | |
| | C(j)-Z(j) | 0 | 0 | 0 | 0 | -1,2500 | -2,5000 | 63,2500 | |



Lampiran 3. Langkah Perhitungan Nilai $\lambda=1-t$ Menggunakan Program WinQSB

Keterangan: $\lambda = x_3$

Memasukkan data

| | OBJ/Constraint/Bound |
|----------------------|------------------------|
| Maximize | x3 |
| C1 | 10x1+15x2-5.75x3>=57.5 |
| C2 | 20x1+15x2+10x3<=110 |
| C3 | 3x1+2.5x2+4x3<=44 |
| C4 | 5x1+8x2+3x3<=33 |
| C5 | 1.5x1+2x2+0.8x3<=8.8 |
| Integer: | |
| Binary: | |
| Unrestricted: | |
| X1 | >=0, <=M |
| X2 | >=0, <=M |
| X3 | >=0, <=M |

Solve and Analyze → Solve and Display Steps.

Iterasi 1

| | | X1 | X2 | X3 | Surplus_C1 | Slack_C2 | Slack_C3 | Slack_C4 | Slack_C5 | Artificial_C1 | R. H. S. | Ratio |
|---------------|-----------|--------|--------|---------|------------|----------|----------|----------|----------|---------------|----------|---------|
| Basis | C(j) | 0 | 0 | 1,000 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Artificial_C1 | -M | 10,000 | 15,000 | -5,7500 | -1,000 | 0 | 0 | 0 | 0 | 1,000 | 57,5000 | 3,8333 |
| Slack_C2 | 0 | 20,000 | 15,000 | 10,000 | 0 | 1,000 | 0 | 0 | 0 | 0 | 110,0000 | 7,3333 |
| Slack_C3 | 0 | 3,000 | 2,500 | 4,000 | 0 | 0 | 1,000 | 0 | 0 | 0 | 44,0000 | 17,6000 |
| Slack_C4 | 0 | 5,000 | 8,000 | 3,000 | 0 | 0 | 0 | 1,000 | 0 | 0 | 33,0000 | 4,1250 |
| Slack_C5 | 0 | 1,500 | 2,000 | 0,800 | 0 | 0 | 0 | 0 | 1,000 | 0 | 8,8000 | 4,4000 |
| | C(j)-Z(j) | 0 | 0 | 1,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | * Big M | 10,000 | 15,000 | -5,7500 | -1,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Lampiran 3. (Lanjutan)

Iterasi 2

| | | X1 | X2 | X3 | Surplus_C1 | Slack_C2 | Slack_C3 | Slack_C4 | Slack_C5 | Artificial_C1 | | |
|----------|-----------|---------|--------|---------|------------|----------|----------|----------|----------|---------------|----------|--------|
| Basis | C(j) | 0 | 0 | 1,0000 | 0 | 0 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| X2 | 0 | 0,6667 | 1,0000 | -0,3833 | -0,0667 | 0 | 0 | 0 | 0 | 0,0667 | 3,8333 | M |
| Slack_C2 | 0 | 10,0000 | 0 | 15,7500 | 1,0000 | 1,0000 | 0 | 0 | 0 | -1,0000 | 52,5000 | 3,3333 |
| Slack_C3 | 0 | 1,3333 | 0 | 4,9583 | 0,1667 | 0 | 1,0000 | 0 | 0 | -0,1667 | 34,4167 | 6,9412 |
| Slack_C4 | 0 | -0,3333 | 0 | 6,0667 | 0,5333 | 0 | 0 | 1,0000 | 0 | -0,5333 | 2,3333 | 0,3846 |
| Slack_C5 | 0 | 0,1667 | 0 | 1,5667 | 0,1333 | 0 | 0 | 0 | 1,0000 | -0,1333 | 1,1333 | 0,7234 |
| | C(j)-Z(j) | 0 | 0 | 1,0000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | * Big M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1,0000 | 0 | |

Iterasi 3

| | | X1 | X2 | X3 | Surplus_C1 | Slack_C2 | Slack_C3 | Slack_C4 | Slack_C5 | Artificial_C1 | | |
|----------|-----------|---------|--------|--------|------------|----------|----------|----------|----------|---------------|----------|---------|
| Basis | C(j) | 0 | 0 | 1,0000 | 0 | 0 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| X2 | 0 | 0,6456 | 1,0000 | 0,0000 | -0,0330 | 0 | 0 | 0,0632 | 0 | 0,0330 | 3,9808 | 6,1660 |
| Slack_C2 | 0 | 10,8654 | 0,0000 | 0,0000 | -0,3846 | 1,0000 | 0 | -2,5962 | 0 | 0,3846 | 46,4423 | 4,2743 |
| Slack_C3 | 0 | 1,6058 | 0,0000 | 0,0000 | -0,2692 | 0 | 1,0000 | -0,8173 | 0 | 0,2692 | 32,5096 | 20,2455 |
| X3 | 1,0000 | -0,0549 | 0,0000 | 1,0000 | 0,0879 | 0 | 0 | 0,1648 | 0 | -0,0879 | 0,3846 | M |
| Slack_C5 | 0 | 0,2527 | 0 | 0 | -0,0044 | 0 | 0 | -0,2582 | 1,0000 | 0,0044 | 0,5308 | 2,1000 |
| | C(j)-Z(j) | 0,0549 | 0 | 0 | -0,0879 | 0 | 0 | -0,1648 | 0 | 0,0879 | 0,3846 | |
| | * Big M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1,0000 | 0 | |

Iterasi 4

| | | X1 | X2 | X3 | Surplus_C1 | Slack_C2 | Slack_C3 | Slack_C4 | Slack_C5 | Artificial_C1 | | |
|----------|-----------|--------|--------|--------|------------|----------|----------|----------|----------|---------------|----------|-------|
| Basis | C(j) | 0 | 0 | 1,0000 | 0 | 0 | 0 | 0 | 0 | 0 | R. H. S. | Ratio |
| X2 | 0 | 0,0000 | 1,0000 | 0,0000 | -0,0217 | 0 | 0 | 0,7228 | -2,5543 | 0,0217 | 2,6250 | |
| Slack_C2 | 0 | 0,0000 | 0,0000 | 0,0000 | -0,1957 | 1,0000 | 0 | 8,5054 | -42,9891 | 0,1957 | 23,6250 | |
| Slack_C3 | 0 | 0,0000 | 0,0000 | 0,0000 | -0,2413 | 0 | 1,0000 | 0,8234 | -6,3533 | 0,2413 | 29,1375 | |
| X3 | 1,0000 | 0,0000 | 0,0000 | 1,0000 | 0,0870 | 0 | 0 | 0,1087 | 0,2174 | -0,0870 | 0,5000 | |
| X1 | 0 | 1,0000 | 0,0000 | 0,0000 | -0,0174 | 0 | 0 | -1,0217 | 3,9565 | 0,0174 | 2,1000 | |
| | C(j)-Z(j) | 0 | 0 | 0 | -0,0870 | 0 | 0 | -0,1087 | -0,2174 | 0,0870 | 0,5000 | |
| | * Big M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1,0000 | 0 | |