



Lampiran 1. Proses Metode Simpleks

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | NK | Rasio |
|----|----|---------------|------|------------|---------------|----|----|----|----------------|----|----|----|----|----|-------------|--------------|
| Z | 0 | - 1064.267 | 2793 | 2038.73333 | - 1912.867 | 0 | 0 | 0 | 43.653333 | 0 | 0 | 0 | 0 | 0 | 873066.6667 | -456.4179417 |
| S1 | 0 | 66.66667 | 0 | 66.6666667 | 91.66667 | 1 | 0 | 0 | - 0.8333333 | 0 | 0 | 0 | 0 | 0 | 133333.3333 | 1454.545455 |
| S2 | 0 | 40 | 0 | 40 | 55 | 0 | 1 | 0 | -0.5 | 0 | 0 | 0 | 0 | 0 | 5000 | 90.90909091 |
| S3 | 0 | 1.066667 | 0 | 1.06666667 | 1.466667 | 0 | 0 | 1 | - 0.0133333 | 0 | 0 | 0 | 0 | 0 | 44733.33333 | 30500 |
| X1 | 1 | 0.466667 | 1 | 0.46666667 | 0.266667 | 0 | 0 | 0 | 0.0066667 | 0 | 0 | 0 | 0 | 0 | 133.3333333 | 500 |
| S5 | 0 | 4.48 | 0 | 4.48 | 6.16 | 0 | 0 | 0 | -0.056 | 1 | 0 | 0 | 0 | 0 | 1380 | 224.025974 |
| S6 | 0 | -6.5 | 0 | 16 | 12 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0 | 0 | 0 | 14000 | 1166.666667 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 525 | 21 |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | NK | Rasio |
|----|----|----------|------|------------|----|----|----|----|-----------|----|----|----|----|-------------|-------------|--------------|
| Z | 0 | 1064.267 | 2793 | 2038.73333 | 0 | 0 | 0 | 0 | 43.653333 | 0 | 0 | 0 | 0 | 76.51466667 | 913236.8667 | -858.0902656 |
| S1 | 0 | 66.66667 | 0 | 66.6666667 | 0 | 1 | 0 | 0 | 0.8333333 | 0 | 0 | 0 | 0 | -3.66666667 | 131408.3333 | 1971.125 |
| S2 | 0 | 40 | 0 | 40 | 0 | 0 | 1 | 0 | -0.5 | 0 | 0 | 0 | 0 | -2.2 | 3845 | 96.125 |
| S3 | 0 | 1.066667 | 0 | 1.06666667 | 0 | 0 | 0 | 1 | 0.0133333 | 0 | 0 | 0 | 0 | -0.05866667 | 44702.53333 | 41908.625 |
| X1 | 1 | 0.466667 | 1 | 0.46666667 | 0 | 0 | 0 | 0 | 0.0066667 | 0 | 0 | 0 | 0 | -0.01066667 | 127.7333333 | 273.7142857 |
| S5 | 0 | 4.48 | 0 | 4.48 | 0 | 0 | 0 | 0 | -0.056 | 1 | 0 | 0 | 0 | -0.2464 | 1250.64 | 279.1607143 |
| S6 | 0 | -6.5 | 0 | 16 | 0 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0 | 0 | -0.48 | 13748 | -2115.076923 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 800 | 22.85714286 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4000 | #DIV/0! |
| X5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 21 | #DIV/0! |

Lampiran 2. Proses Metode *Cutting Plane*

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | NK |
|-------|---------|---------|-----------|-----------|---------|---------|---------|---------|-----------|---------|---------|-------------|---------|-------------|--------|--------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 43.6533 | 0.0000 | 0.0000 | 30.4076 | 0.0000 | 76.5147 | 0.0000 | 937562.9619 |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -0.8333 | 0.0000 | 0.0000 | -1.9048 | 0.0000 | -3.6667 | 0.0000 | 129884.5238 |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | -0.5000 | 0.0000 | 0.0000 | -1.1429 | 0.0000 | -2.2000 | 0.0000 | 2930.7143 |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.0133 | 0.0000 | 0.0000 | -0.0305 | 0.0000 | -0.0587 | 0.0000 | 44678.1524 |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0067 | 0.0000 | 0.0000 | -0.0133 | 0.0000 | -0.0107 | 0.0000 | 117.0667 |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0560 | 1.0000 | 0.0000 | -0.1280 | 0.0000 | -0.2464 | 0.0000 | 1148.2400 |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.2000 | 0.0000 | 1.0000 | 0.1857 | 0.0000 | -0.4800 | 0.0000 | 13896.5714 |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0286 | 0.0000 | 0.0000 | 0.0000 | 22.8571 |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 4000.0000 |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 21.0000 |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0067 | 0.0000 | 0.0000 | 0.0133 | 0.0000 | 0.0107 | 1.0000 | -0.0667 |
| Rasio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 6515.4229 | #DIV/0! | #DIV/0! | 2286.287146 | #DIV/0! | 7150.903427 | 0 | -14056416.22 |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | NK |
|-----|--------|--------|-----------|-----------|--------|--------|--------|--------|--------|--------|--------|----------|--------|----------|-----------|-------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 117.0627 | 0.0000 | 146.2297 | 6515.4229 | 937128.3832 |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -3.5590 | 0.0000 | -4.9975 | -124.3781 | 129892.8198 |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.1354 | 0.0000 | -2.9985 | -74.6269 | 2935.6919 |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0569 | 0.0000 | -0.0800 | -1.9900 | 44678.2851 |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | 0.0000 | 0.0000 | 0.9950 | 117.0003 |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | -0.2392 | 0.0000 | -0.3358 | -8.3582 | 1148.7975 |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.2113 | 0.0000 | -0.7994 | -29.8507 | 13898.5625 |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0286 | 0.0000 | 0.0000 | 0.0000 | 22.8571 |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 4000.0000 |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 21.0000 |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -1.9851 | 0.0000 | -1.5970 | -149.2537 | 9.9552 |

Lampiran 3. Proses Metode *Cutting Plane*

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | Sg2 | NK |
|-------|---------|---------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|--------------|---------|----------|------------|--------|-----------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 117.0627 | 0.0000 | 146.2297 | 6515.4229 | 0.0000 | 937128.3832 |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -3.5590 | 0.0000 | -4.9975 | -124.3781 | 0.0000 | 129892.8198 |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.1354 | 0.0000 | -2.9985 | -74.6269 | 0.0000 | 2935.6919 |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0569 | 0.0000 | -0.0800 | -1.9900 | 0.0000 | 44678.2851 |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | 0.0000 | 0.0000 | 0.9950 | 0.0000 | 117.0003 |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | -0.2392 | 0.0000 | -0.3358 | -8.3582 | 0.0000 | 1148.7975 |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.2113 | 0.0000 | -0.7994 | -29.8507 | 0.0000 | 13898.5625 |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0286 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 22.8571 |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 4000.0000 |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 0.0000 | 21.0000 |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -1.9851 | 0.0000 | -1.5970 | -149.2537 | 0.0000 | 9.9552 |
| Sg2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0000 | 0.0000 | -0.9950 | 1.0000 | -0.0003 |
| Rasio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 1170627.4343 | #DIV/0! | #DIV/0! | -6548.1637 | 0.0000 | 3123761277.3277 |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | Sg2 | NK |
|-----|--------|--------|-----------|-----------|--------|--------|--------|--------|--------|--------|--------|----------|--------|----------|--------|-----------|-------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 117.7176 | 0.0000 | 146.2297 | 0.0000 | 6548.1637 | 937126.4187 |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -3.5715 | 0.0000 | -4.9975 | 0.0000 | -125.0031 | 129892.8573 |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.1429 | 0.0000 | -2.9985 | 0.0000 | -75.0019 | 2935.7144 |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0571 | 0.0000 | -0.0800 | 0.0000 | -2.0001 | 44678.2857 |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 117.0000 |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | -0.2400 | 0.0000 | -0.3358 | 0.0000 | -8.4002 | 1148.8000 |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.2143 | 0.0000 | -0.7994 | 0.0000 | -30.0008 | 13898.5715 |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0286 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 22.8571 |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 4000.0000 |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 0.0000 | 21.0000 |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -2.0001 | 0.0000 | -1.5970 | 0.0000 | -150.0038 | 10.0002 |
| Sg2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | 0.0000 | 0.0000 | 1.0000 | -1.0050 | 0.0003 |

Lampiran 4. Proses Metode *Cutting Plane*

Iterasi 5

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | Sg2 | Sg3 | NK | |
|-------|---------|---------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|-------------|---------|----------|---------|-----------|---------|-------------|-------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 117.7176 | 0.0000 | 146.2297 | 0.0000 | 6548.1637 | 0.0000 | 937126.4187 | |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -3.5715 | 0.0000 | -4.9975 | 0.0000 | -125.0031 | 0.0000 | 129892.8573 | |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.1429 | 0.0000 | -2.9985 | 0.0000 | -75.0019 | 0.0000 | 2935.7144 | |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0571 | 0.0000 | -0.0800 | 0.0000 | -2.0001 | 0.0000 | 44678.2857 | |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 117.0000 | |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | -0.2400 | 0.0000 | -0.3358 | 0.0000 | -8.4002 | 0.0000 | 1148.8000 | |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.2143 | 0.0000 | -0.7994 | 0.0000 | -30.0008 | 0.0000 | 13898.5715 | |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0286 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 22.8571 | |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 4000.0000 | |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 0.0000 | 0.0000 | 21.0000 | |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -2.0001 | 0.0000 | -1.5970 | 0.0000 | -150.0038 | 0.0000 | 10.0002 | |
| Sg2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | 0.0000 | 0.0000 | 1.0000 | -1.0050 | 0.0000 | 0.0003 | |
| Sg3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0286 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -0.8571 | |
| Rasio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 4115.998594 | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 0 | 1093368.824 |

Iterasi 6

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | Sg2 | Sg3 | NK | |
|-----|--------|--------|-----------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|--------|-----------|-----------|--------------|-------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 146.2297 | 0.0000 | 6548.1637 | 4115.9986 | 933598.5964 | |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -4.9975 | 0.0000 | -125.0031 | -124.8773 | 129999.8897 | |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.9985 | 0.0000 | -75.0019 | -74.9264 | 2999.9338 | |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0800 | 0.0000 | -2.0001 | -1.9980 | 44679.9982 | |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 117.0000 | |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.3358 | 0.0000 | -8.4002 | -8.3918 | 1155.9926 | |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -0.7994 | 0.0000 | -30.0008 | -7.4930 | 13904.9938 | |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.9990 | 22.0009 | |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 4000.0000 | |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 0.0000 | 0.0000 | 21.0000 | |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -1.5970 | 0.0000 | -150.0038 | -69.9327 | 69.9395 | |
| Sg2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -1.0050 | -0.0035 | 0.0033 | |
| Sg3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -34.96503497 | 29.96853147 |

Lampiran 5. Proses Metode *Cutting Plane*

Iterasi 7

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | Sg1 | Sg2 | Sg3 | Sg4 | NK | |
|-------|---------|---------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|-----------|-----------|-------------|-------------|------------|
| Z | 0.0000 | 0.0000 | 2793.0000 | 3103.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 146.2297 | 0.0000 | 6548.1637 | 4115.9986 | 0.0000 | 933598.5964 | |
| S1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -4.9975 | 0.0000 | -125.0031 | -124.8773 | 0.0000 | 129999.8897 | |
| S2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -2.9985 | 0.0000 | -75.0019 | -74.9264 | 0.0000 | 2999.9338 | |
| S3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0800 | 0.0000 | -2.0001 | -1.9980 | 0.0000 | 44679.9982 | |
| X1 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 117.0000 | |
| S5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | -0.3358 | 0.0000 | -8.4002 | -8.3918 | 0.0000 | 1155.9926 | |
| S6 | 0.0000 | 0.0000 | 0.0000 | 22.5000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | -0.7994 | 0.0000 | -30.0008 | -7.4930 | 0.0000 | 13904.9938 | |
| X2 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.9990 | 0.0000 | 22.0009 | |
| S8 | 0.0000 | 0.0000 | 75.0000 | 75.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 4000.0000 | |
| X5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0400 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 21.0000 | |
| Sg1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -1.5970 | 0.0000 | -150.0038 | -69.9327 | 0.0000 | 69.9395 | |
| Sg2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | -1.0050 | -0.0035 | 0.0000 | 0.0033 | |
| Sg3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -34.9650 | 0.0000 | 29.9685 | |
| Sg4 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.9990 | 1.0000 | -0.0009 | |
| Rasio | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | 4120.118713 | 0 | 1037331774 |

Iterasi 8

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | 5g1 | 5g2 | 5g3 | 5g4 | NK | |
|-----|----|----|------|------|----|----|----|----|----|----|----|----|----|----|-----|-----|------|-----|------|--------|
| Z | 0 | 0 | 2793 | 3103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146 | 0 | 6548 | 0 | 4120 | 933595 |
| S1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -5 | 0 | -125 | 0 | -125 | 130000 |
| S2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -3 | 0 | -75 | 0 | -75 | 3000 |
| S3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | -2 | 44680 |
| X1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 |
| S5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -8 | 0 | -8 | 1156 |
| S6 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -1 | 0 | -30 | 0 | -8 | 13905 |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4000 |
| X5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 5g1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | -150 | 0 | -70 | 70 |
| 5g2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | -1 | 0 | 0 | 0 |
| 5g3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -35 | 30 |
| 5g4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | -1 | 0 |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|--------|-------------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.6190476 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 117 | 117 |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|--------|--------------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 766116 | -185.9504854 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 1517.2 | 180.6190476 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 800 | 22.85714286 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 117 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|----|----|----|-------|------|-------|----|----|----|----|----|----|-------------|----|----|------|-------------|--------------|
| Z | 0 | 0 | -3755 | 3103 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 117.7142857 | 0 | 0 | 6548 | 860287.4286 | -229.1045083 |
| S1 | 0 | 0 | 125 | 0 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 3.571428571 | 0 | 0 | -125 | 132517.8571 | 1060.142857 |
| S2 | 0 | 0 | 75 | 0 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 2.142857143 | 0 | 0 | -75 | 4510.714286 | 60.14285714 |
| S3 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0.057142857 | 0 | 0 | -2 | 44720.28571 | 22360.14286 |
| S4 | 0 | 0 | 150 | 0 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | -2 | 0 | 0 | -150 | 850 | 5.666666667 |
| S5 | 0 | 0 | 8.4 | 0 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | -0.24 | 0 | 0 | -8.4 | 1325.2 | 157.7619048 |
| S6 | 0 | 0 | 30 | 22.5 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0.214285714 | 0 | 0 | -30 | 14318.57143 | 477.2857143 |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.028571429 | 0 | 0 | 0 | 22.85714286 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 | 53.33333333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 117 | #DIV/0! |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio | |
|----|----|----|----|------|----------|----|----|----|-----------|----|----|-------------|----|----|------|-------------|--------------|---------|
| Z | 0 | 0 | 0 | 3103 | 2657.667 | 0 | 0 | 0 | 25.033333 | 0 | 0 | 67.64761905 | 0 | 0 | 2793 | 881565.7619 | -331.7066707 | |
| S1 | 0 | 0 | 0 | 0 | 91.66667 | 1 | 0 | 0 | 0.8333333 | 0 | 0 | 1.904761905 | 0 | 0 | 0 | 131809.5238 | 1437.922078 | |
| S2 | 0 | 0 | 0 | 0 | 55 | 0 | 1 | 0 | -0.5 | 0 | 0 | 1.142857143 | 0 | 0 | 0 | 4085.714286 | 74.28571429 | |
| S3 | 0 | 0 | 0 | 0 | 1.466667 | 0 | 0 | 1 | 0.0133333 | 0 | 0 | -0.03047619 | 0 | 0 | 0 | 44708.95238 | 30483.37662 | |
| X3 | 0 | 0 | 1 | 0 | 0.266667 | 0 | 0 | 0 | 0.0066667 | 0 | 0 | 0.013333333 | 0 | 0 | -1 | 5.666666667 | 21.25 | |
| S5 | 0 | 0 | 0 | 0 | 6.16 | 0 | 0 | 0 | -0.056 | 1 | 0 | -0.128 | 0 | 0 | 0 | 1277.6 | 207.4025974 | |
| S6 | 0 | 0 | 0 | 22.5 | 12 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0.185714286 | 0 | 0 | 0 | 14148.57143 | 1179.047619 | |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.028571429 | 0 | 0 | 0 | 22.85714286 | #DIV/0! | |
| S8 | 0 | 0 | 0 | 75 | -20 | 0 | 0 | 0 | -0.5 | 0 | 0 | 0 | 1 | 1 | 0 | 75 | 3575 | -178.75 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | 21 | |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 117 | #DIV/0! | |

Lampiran 7. Proses Metode *Branch and Bound*

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|--------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2500 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 18000 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 800 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|--------|-------------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.6190476 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio | |
|----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-------|--------|--------------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -6548 | 772664 | -187.5398058 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 135250 | 1082 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 6150 | 82 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 44764 | 22382 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 150 | 2300 | 32.85714286 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8.4 | 1508.8 | 179.6190476 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 30 | 14460 | 1928 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 800 | 22.85714286 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|----|----|----|-------|------|-------|----|----|----|----|----|----|-------------|----|----|-------|-------------|--------------|
| Z | 0 | 0 | -3755 | 3103 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 117.7142857 | 0 | 0 | -6548 | 866835.4286 | -230.8483165 |
| S1 | 0 | 0 | 125 | 0 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 3.571428571 | 0 | 0 | 125 | 132392.8571 | 1059.142857 |
| S2 | 0 | 0 | 75 | 0 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 2.142857143 | 0 | 0 | 75 | 4435.714286 | 59.14285714 |
| S3 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0.057142857 | 0 | 0 | 2 | 44718.28571 | 22359.14286 |
| S4 | 0 | 0 | 150 | 0 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | -2 | 0 | 0 | 150 | 700 | 4.666666667 |
| S5 | 0 | 0 | 8.4 | 0 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | -0.24 | 0 | 0 | 8.4 | 1316.8 | 156.7619048 |
| S6 | 0 | 0 | 30 | 22.5 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0.214285714 | 0 | 0 | 30 | 14288.57143 | 476.2857143 |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.028571429 | 0 | 0 | 0 | 22.85714286 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 | 53.33333333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 | #DIV/0! |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK | Rasio |
|----|----|----|----|------|----------|----|----|----|-----------|----|----|-------------|----|----|-------|-------------|--------------|
| Z | 0 | 0 | 0 | 3103 | 2657.667 | 0 | 0 | 0 | 25.033333 | 0 | 0 | 67.64761905 | 0 | 0 | -2793 | 884358.7619 | -332.7575926 |
| S1 | 0 | 0 | 0 | 0 | 91.66667 | 1 | 0 | 0 | 0.8333333 | 0 | 0 | 1.904761905 | 0 | 0 | 0 | 131809.5238 | 1437.922078 |
| S2 | 0 | 0 | 0 | 0 | 55 | 0 | 1 | 0 | -0.5 | 0 | 0 | 1.142857143 | 0 | 0 | 0 | 4085.714286 | 74.28571429 |
| S3 | 0 | 0 | 0 | 0 | 1.466667 | 0 | 0 | 1 | 0.0133333 | 0 | 0 | -0.03047619 | 0 | 0 | 0 | 44708.95238 | 30483.37662 |
| X3 | 0 | 0 | 1 | 0 | 0.266667 | 0 | 0 | 0 | 0.0066667 | 0 | 0 | 0.013333333 | 0 | 0 | 1 | 4.666666667 | 17.5 |
| S5 | 0 | 0 | 0 | 0 | 6.16 | 0 | 0 | 0 | -0.056 | 1 | 0 | -0.128 | 0 | 0 | 0 | 1277.6 | 207.4025974 |
| S6 | 0 | 0 | 0 | 22.5 | 12 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0.185714286 | 0 | 0 | 0 | 14148.57143 | 1179.047619 |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.028571429 | 0 | 0 | 0 | 22.85714286 | #DIV/0! |
| S8 | 0 | 0 | 0 | 75 | -20 | 0 | 0 | 0 | -0.5 | 0 | 0 | 1 | 1 | 0 | -75 | 3650 | -182.5 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 | #DIV/0! |

Iterasi 5

| Z | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | NK |
|----|----|----|---------|------|----|----|----|----|--------|----|----|-------------|----|----|---------|-------------|
| Z | 0 | 0 | 9966.25 | 3103 | 0 | 0 | 0 | 0 | 91.475 | 0 | 0 | 65.23571429 | 0 | 0 | 7173.25 | 930867.9286 |
| S1 | 0 | 0 | -343.75 | 0 | 0 | 1 | 0 | 0 | -3.125 | 0 | 0 | 2.678571429 | 0 | 0 | -343.75 | 130205.3571 |
| S2 | 0 | 0 | -206.25 | 0 | 0 | 0 | 1 | 0 | -1.875 | 0 | 0 | 1.607142857 | 0 | 0 | -206.25 | 3123.214286 |
| S3 | 0 | 0 | -5.5 | 0 | 0 | 0 | 0 | 1 | -0.05 | 0 | 0 | 0.042857143 | 0 | 0 | -5.5 | 44683.28571 |
| X5 | 0 | 0 | 3.75 | 0 | 1 | 0 | 0 | 0 | 0.025 | 0 | 0 | -0.05 | 0 | 0 | 3.75 | 17.5 |
| S5 | 0 | 0 | -23.1 | 0 | 0 | 0 | 0 | 0 | -0.21 | 1 | 0 | 0.18 | 0 | 0 | -23.1 | 1169.8 |
| S6 | 0 | 0 | -45 | 22.5 | 0 | 0 | 0 | 0 | -0.5 | 0 | 1 | 0.785714286 | 0 | 0 | -45 | 13938.57143 |
| X2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.028571429 | 0 | 0 | 0 | 22.85714286 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4000 |
| S9 | 0 | 0 | -93.75 | 0 | 0 | 0 | 0 | 0 | -0.625 | 0 | 0 | 1.25 | 0 | 1 | -93.75 | 87.5 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 118 |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | Rasio |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|--------|----------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 117 | 117 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | Rasio |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|-----|--------|----------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 0 | 766116 | -185.95 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 0 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 0 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 0 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 0 | 1517.2 | 180.619 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 0 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 800 | 22.85714 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 117 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | 22 |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | Rasio |
|----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|------|--------|----------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 856756 | -228.164 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 132625 | 1061 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 4575 | 61 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 44722 | 22361 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 910 | 6.066667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 1332.4 | 158.619 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 14325 | 477.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | 53.33333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | Rasio |
|----|----|----|----|----------|----------|----|----|----|----------|----|----|----|----|----|------|----------|----------|----------|
| Z | 0 | 0 | 0 | 735.3333 | -2657.67 | 0 | 0 | 0 | 25.03333 | 0 | 0 | 0 | 0 | 0 | 2793 | 2367.667 | 879536.3 | -330.943 |
| S1 | 0 | 0 | 0 | 66.66667 | 91.66667 | 1 | 0 | 0 | -0.83333 | 0 | 0 | 0 | 0 | 0 | 0 | -66.6667 | 131866.7 | 1438.545 |
| S2 | 0 | 0 | 0 | 40 | 55 | 0 | 1 | 0 | -0.5 | 0 | 0 | 0 | 0 | 0 | 0 | -40 | 4120 | 74.90909 |
| S3 | 0 | 0 | 0 | 1.066667 | 1.466667 | 0 | 0 | 1 | -0.01333 | 0 | 0 | 0 | 0 | 0 | 0 | -1.06667 | 44709.87 | 30484 |
| X3 | 0 | 0 | 1 | 0.466667 | 0.266667 | 0 | 0 | 0 | 0.006667 | 0 | 0 | 0 | 0 | 0 | -1 | -0.46667 | 6.066667 | 22.75 |
| S5 | 0 | 0 | 0 | 4.48 | 6.16 | 0 | 0 | 0 | -0.056 | 1 | 0 | 0 | 0 | 0 | 0 | -4.48 | 1281.44 | 208.026 |
| S6 | 0 | 0 | 0 | 16 | 12 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0 | 0 | 0 | 0 | 6.5 | 14143 | 1178.583 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 40 | -20 | 0 | 0 | 0 | -0.5 | 0 | 0 | 0 | 1 | 0 | 75 | 35 | 3545 | -177.25 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | RASIO |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|--------|----------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 118 | 118 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | RASIO |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-------|-----|--------|----------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -6548 | 0 | 772664 | -187.54 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 0 | 135250 | 1082 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 0 | 6150 | 82 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 44764 | 22382 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 150 | 0 | 2300 | 32.85714 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8.4 | 0 | 1508.8 | 179.619 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 30 | 0 | 14460 | 1928 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 800 | 22.85714 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 118 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | 22 |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | RASIO |
|----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|-------|------|--------|----------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -6548 | 4120 | 863304 | -229.908 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | -125 | 132500 | 1060 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | -75 | 4500 | 60 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | -2 | 44720 | 22360 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 150 | -70 | 760 | 5.066667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8.4 | -8.4 | 1324 | 157.619 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 30 | -7.5 | 14295 | 476.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4000 | 53.33333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 118 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | NK | RASIO |
|----|----|----|----|----------|----------|----|----|----|----------|----|----|----|----|----|-------|----------|----------|----------|
| Z | 0 | 0 | 0 | 735.3333 | -2657.67 | 0 | 0 | 0 | 25.03333 | 0 | 0 | 0 | 0 | 0 | -2793 | 2367.667 | 882329.3 | -331.994 |
| S1 | 0 | 0 | 0 | 66.66667 | 91.66667 | 1 | 0 | 0 | -0.83333 | 0 | 0 | 0 | 0 | 0 | 0 | -66.6667 | 131866.7 | 1438.545 |
| S2 | 0 | 0 | 0 | 40 | 55 | 0 | 1 | 0 | -0.5 | 0 | 0 | 0 | 0 | 0 | 0 | -40 | 4120 | 74.90909 |
| S3 | 0 | 0 | 0 | 1.066667 | 1.466667 | 0 | 0 | 1 | -0.01333 | 0 | 0 | 0 | 0 | 0 | 0 | -1.06667 | 44709.87 | 30484 |
| X3 | 0 | 0 | 1 | 0.466667 | 0.266667 | 0 | 0 | 0 | 0.006667 | 0 | 0 | 0 | 0 | 0 | 1 | -0.46667 | 5.066667 | 19 |
| S5 | 0 | 0 | 0 | 4.48 | 6.16 | 0 | 0 | 0 | -0.056 | 1 | 0 | 0 | 0 | 0 | 0 | -4.48 | 1281.44 | 208.026 |
| S6 | 0 | 0 | 0 | 16 | 12 | 0 | 0 | 0 | -0.2 | 0 | 1 | 0 | 0 | 0 | 0 | 6.5 | 14143 | 1178.583 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 40 | -20 | 0 | 0 | 0 | -0.5 | 0 | 0 | 0 | 1 | 0 | -75 | 35 | 3620 | -181 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 118 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | #DIV/0! |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | Rasio |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|-----|--------|------------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.333333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619048 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | 117 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | Rasio |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|-----|-----|--------|------------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 0 | 0 | 766116 | -185.95049 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 0 | 0 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 0 | 0 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | 0 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 0 | 0 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 0 | 0 | 1517.2 | 180.619048 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 0 | 0 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 800 | 22.8571429 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | 22 |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | Rasio |
|-----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|------|-----|--------|-------------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 0 | 856756 | -228.16405 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 0 | 910 | 6.06666667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 0 | 1332.4 | 158.619048 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 0 | 14325 | 477.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | 53.33333333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | Rasio |
|----|----|----|----|-------|-------|----|----|----|----|----|----|----|----|----|------|------|------|--------|------------|
| Z | 0 | 0 | 0 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 3755 | 856756 | -234.15031 |
| S1 | 0 | 0 | 0 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | -125 | 132625 | 1061 |
| S2 | 0 | 0 | 0 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | -75 | 4575 | 61 |
| S3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | -2 | 44722 | 22361 |
| S4 | 0 | 0 | 0 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | -150 | 910 | 22.75 |
| S5 | 0 | 0 | 0 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | -8.4 | 1332.4 | 158.619048 |
| S6 | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | -30 | 14325 | 716.25 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 5

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | Rasio | |
|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|----|--------|------|------|------|------------|------------|
| Z | 0 | 0 | 0 | -1017 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146.36 | 6548 | 4120 | 3755 | 933595 | -917.98918 |
| S1 | 0 | 0 | 0 | 125 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -5 | -125 | -125 | -125 | 130000 | 1040 |
| S2 | 0 | 0 | 0 | 75 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -3 | -75 | -75 | -75 | 3000 | 40 |
| S3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -0.08 | -2 | -2 | -2 | 44680 | 22340 |
| S4 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -1.6 | -150 | -70 | -150 | 70 | 1 |
| S5 | 0 | 0 | 0 | 8.4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -0.336 | -8.4 | -8.4 | -8.4 | 1156 | 137.619048 |
| S6 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -0.8 | -30 | -7.5 | -30 | 13905 | 463.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -35 | 0 | 30 | 0.85714286 |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 4000 | 53.3333333 | |
| X5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0 | 0 | 0 | 21 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | RASIO |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|-----|--------|------------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.333333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619048 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | 117 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | RASIO |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|-----|-----|--------|------------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 0 | 0 | 766116 | -185.95049 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 0 | 0 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 0 | 0 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | 0 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 0 | 0 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 0 | 0 | 1517.2 | 180.619048 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 0 | 0 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 800 | 22.8571429 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | 22 |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | RASIO |
|-----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|------|-----|--------|------------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 0 | 856756 | -228.16405 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 0 | 910 | 6.06666667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 0 | 1332.4 | 158.619048 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 0 | 14325 | 477.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4000 | 53.3333333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | 1 |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | NK | RASIO |
|----|----|----|----|-------|-------|----|----|----|----|----|----|----|----|----|------|------|-------|--------|------------|
| Z | 0 | 0 | 0 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | -3755 | 860511 | -235.17655 |
| S1 | 0 | 0 | 0 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 125 | 132500 | 1060 |
| S2 | 0 | 0 | 0 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 75 | 4500 | 60 |
| S3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 2 | 44720 | 22360 |
| S4 | 0 | 0 | 0 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 150 | 760 | 19 |
| S5 | 0 | 0 | 0 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 8.4 | 1324 | 157.619048 |
| S6 | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 30 | 14295 | 714.75 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 75 | 3925 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | Rasio | |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|----|--------|----------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 117 | 117 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | Rasio |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|-----|-----|-----|--------|----------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 0 | 0 | 0 | 766116 | -185.95 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 0 | 0 | 0 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 0 | 0 | 0 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | 0 | 0 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 0 | 0 | 0 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 0 | 0 | 0 | 1517.2 | 180.619 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 0 | 0 | 0 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 800 | 22.85714 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | 22 |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | Rasio |
|-----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|------|-----|-----|--------|----------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 0 | 0 | 856756 | -228.164 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 0 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 0 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 0 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 0 | 0 | 910 | 6.066667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 0 | 0 | 1332.4 | 158.619 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 0 | 0 | 14325 | 477.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4000 | 53.33333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | Rasio |
|-----|----|----|----|-------|-------|----|----|----|----|----|----|----|----|----|------|------|------|-----|--------|---------|
| Z | 0 | 0 | 0 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 3755 | 0 | 856756 | -234.15 |
| S1 | 0 | 0 | 0 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | -125 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 0 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | -75 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | -2 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 0 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | -150 | 0 | 910 | 22.75 |
| S5 | 0 | 0 | 0 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | -8.4 | 0 | 1332.4 | 158.619 |
| S6 | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | -30 | 0 | 14325 | 716.25 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | #DIV/0! |

Iterasi 5

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | Rasio |
|-----|----|----|----|-------|----|----|----|----|----|----|----|----|----|--------|------|------|------|-----|--------|-----------|
| Z | 0 | 0 | 0 | -1017 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146.36 | 6548 | 4120 | 3755 | 0 | 933595 | -917.989 |
| S1 | 0 | 0 | 0 | 125 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -5 | -125 | -125 | -125 | 0 | 130000 | 1040 |
| S2 | 0 | 0 | 0 | 75 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -3 | -75 | -75 | -75 | 0 | 3000 | 40 |
| S3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -0.08 | -2 | -2 | -2 | 0 | 44680 | 22340 |
| S4 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -1.6 | -150 | -70 | -150 | 0 | 70 | 1 |
| S5 | 0 | 0 | 0 | 8.4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -0.336 | -8.4 | -8.4 | -8.4 | 0 | 1156 | 137.619 |
| S6 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | -0.8 | -30 | -7.5 | -30 | 0 | 13905 | 463.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | 0.857143 |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 0 | 4000 | 53.333333 |
| X5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0 | 0 | 0 | 0 | 21 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Iterasi 1

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | RASIO |
|-----|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|--------|----------|
| Z | -6548 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S1 | 125 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150000 | 1200 |
| S2 | 75 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15000 | 200 |
| S3 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45000 | 22500 |
| S4 | 150 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20000 | 133.3333 |
| S5 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2500 | 297.619 |
| S6 | 30 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18000 | 600 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 800 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| S10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | 117 |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 2

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | RASIO |
|-----|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|-----|-----|-----|--------|----------|
| Z | 0 | -4120 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 0 | 0 | 0 | 766116 | -185.95 |
| S1 | 0 | 125 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | 0 | 0 | 0 | 135375 | 1083 |
| S2 | 0 | 75 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | 0 | 0 | 0 | 6225 | 83 |
| S3 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | 0 | 0 | 0 | 44766 | 22383 |
| S4 | 0 | 70 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | 0 | 0 | 0 | 2450 | 35 |
| S5 | 0 | 8.4 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | 0 | 0 | 0 | 1517.2 | 180.619 |
| S6 | 0 | 7.5 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | 0 | 0 | 0 | 14490 | 1932 |
| S7 | 0 | 35 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 800 | 22.85714 |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| S11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | 22 |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 3

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | RASIO |
|-----|----|----|-------|-------|-------|----|----|----|----|----|----|----|----|----|------|------|-----|-----|--------|----------|
| Z | 0 | 0 | -3755 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 0 | 0 | 856756 | -228.164 |
| S1 | 0 | 0 | 125 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | 0 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 75 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | 0 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | 0 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 150 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | 0 | 0 | 910 | 6.066667 |
| S5 | 0 | 0 | 8.4 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | 0 | 0 | 1332.4 | 158.619 |
| S6 | 0 | 0 | 30 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | 0 | 0 | 14325 | 477.5 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 75 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4000 | 53.33333 |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | #DIV/0! |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| S12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

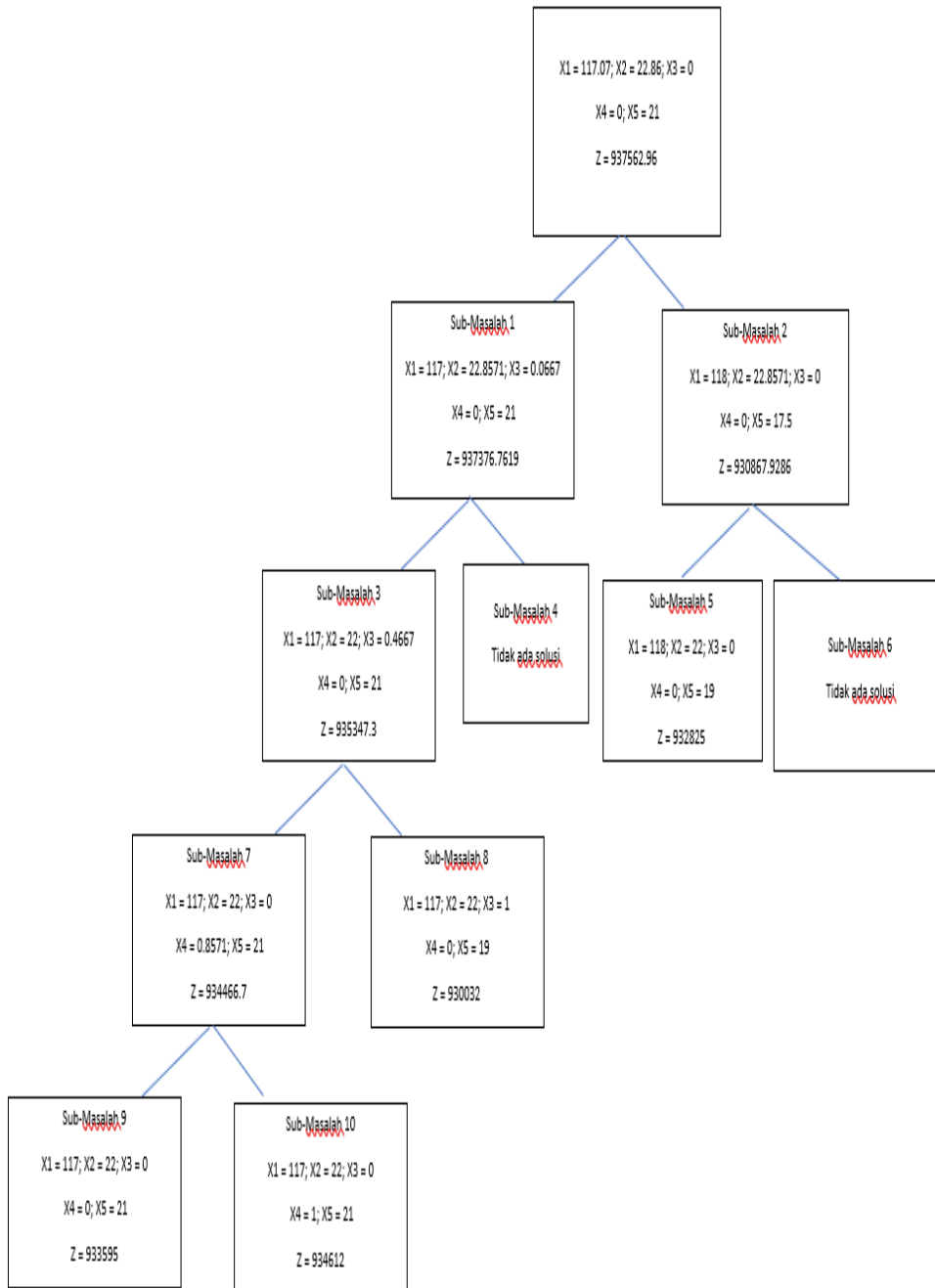
Iterasi 4

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | RASIO |
|-----|----|----|----|-------|-------|----|----|----|----|----|----|----|----|----|------|------|------|-----|--------|---------|
| Z | 0 | 0 | 0 | -1017 | -3659 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6548 | 4120 | 3755 | 0 | 856756 | -234.15 |
| S1 | 0 | 0 | 0 | 125 | 125 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -125 | -125 | -125 | 0 | 132625 | 1061 |
| S2 | 0 | 0 | 0 | 75 | 75 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -75 | -75 | -75 | 0 | 4575 | 61 |
| S3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | -2 | 0 | 44722 | 22361 |
| S4 | 0 | 0 | 0 | 70 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -150 | -70 | -150 | 0 | 910 | 22.75 |
| S5 | 0 | 0 | 0 | 8.4 | 8.4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -8.4 | -8.4 | -8.4 | 0 | 1332.4 | 158.619 |
| S6 | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -30 | -7.5 | -30 | 0 | 14325 | 716.25 |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | #DIV/0! |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 0 | 4000 | #DIV/0! |
| S9 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 525 | 21 |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | #DIV/0! |

Iterasi 5

| BV | X1 | X2 | X3 | X4 | X5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | S13 | NK | RASIO | |
|-----|----|----|----|-------|----|----|----|----|----|----|----|----|----|--------|------|------|------|-----|--------|----------|---|
| Z | 0 | 0 | 0 | -1017 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146.36 | 6548 | 4120 | 3755 | 0 | 933595 | -917.989 | |
| S1 | 0 | 0 | 0 | 125 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -5 | -125 | -125 | -125 | 0 | 130000 | 1040 | |
| S2 | 0 | 0 | 0 | 75 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -3 | -75 | -75 | -75 | 0 | 3000 | 40 | |
| S3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -0.08 | -2 | -2 | -2 | 0 | 44680 | 22340 | |
| S4 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -1.6 | -150 | -70 | -150 | 0 | 70 | 1 | |
| S5 | 0 | 0 | 0 | 8.4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -0.336 | -8.4 | -8.4 | -8.4 | 0 | 1156 | 137.619 | |
| S6 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | -0.8 | -30 | -7.5 | -30 | 0 | 13905 | 463.5 | |
| S7 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -35 | 0 | 0 | 30 | 0.857143 | |
| S8 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | -75 | 0 | 4000 | 53.33333 | |
| X5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0 | 0 | 0 | 0 | 21 | #DIV/0! | |
| X1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 117 | #DIV/0! | |
| X2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 22 | #DIV/0! | |
| X3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | #DIV/0! | |
| S13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | 1 |

Lampiran 14. Pohon Percabangan Metode *Branch and Bound*



Lampiran 15. Bahasa Pemrograman Python OptimasiApp

```
# ----- IMPORT MODULE YANG DIGUNAKAN ----- #

import streamlit as st
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from streamlit_option_menu import option_menu
import plotly.express as px
import plotly.figure_factory as ff
import base64
import pickle

from gurobipy import *
import numpy as np

# ----- IMPORT DATASET VISUALISASI ----- #

def data():
    col1, col2, col3 = st.columns(3)
    with col2:
        st.write("** Data Ini Bersumber dari referensi Artikel")
        st.dataframe(df)

# ----- MEMBUAT TAMPILAN ----- #

st.set_page_config(
    page_title="Optimasi app",
    page_icon="🍌",
    layout="wide",
    initial_sidebar_state="expanded",
    menu_items={
        'Get Help': 'https://www.extremelycoolapp.com/help',
        'Report a bug': 'https://www.extremelycoolapp.com/bug',
        'About': "# This is a header. This is an *extremely* cool app!"
    }
)

# Encoding untuk gambar background
def add_bg_from_local(image_file):
    with open(image_file, "rb") as image_file:
        encoded_string = base64.b64encode(image_file.read())
    st.markdown(
        f"""
        <style>
        .stApp {{
            background-image: url(data:image/png;base64,{encoded_string.decode()});
            background-size: cover
        }}
        </style>
        """
        ,
        unsafe_allow_html=True
    )
add_bg_from_local('bg_knn_fix.jpg')

# Encoding untuk gambar side bar
def get_img_as_base64(file):
    with open(file, "rb") as f:
        data = f.read()
    return base64.b64encode(data).decode()

img = get_img_as_base64("side.jpg")
page_bg_img = f"""
<style>

[data-testid="stSidebar"] > div:first-child {{
background-image: url("data:image/png;base64,{img}");
background-position: center;
background-repeat: no-repeat;
background-attachment: fixed;
}}
[data-testid="stHeader"] {{
background: rgba(0,0,0,0);
}}
[data-testid="stToolbar"] {{
right: 2rem;
}}
</style>
"""

st.markdown(page_bg_img, unsafe_allow_html=True)
```

```

st.write("""
# APLIKASI OPTIMASI PENJUALAN PIE SUSU CV DHIAN MANDIRI 🍪
""")

# ----- FUNGSI CUTTING PLANE ----- #
def cutting_plane_optimization():

    st.header("Metode Cutting Plane")
    #a1 = "Pie Susu Rasa Original"
    #a2 = "Pie Susu Rasa Coklat"
    #a3 = "Pie Susu Rasa Keju"
    #a4 = "Pie Susu Rasa Coklat Keju"
    #a5 = "Pie Susu Rasa Strawberry"
    #col1, col2, col3, col4, col5= st.columns(5)
    #with col1:
    #    st.success(f"x1 = {a1}")
    #with col2:
    #    st.success(f"x2 = {a2}")
    #with col3:
    #    st.success(f"x3 = {a3}")
    #with col4:
    #    st.success(f"x4 = {a4}")
    #with col5:
    #    st.success(f"x5 = {a5}")
    st.header("Masukkan Koefisien Fungsi Tujuan:")

    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_x1 = st.number_input("x1", key="koef_x1", value=0.0)
    with col2:
        koefisien_x2 = st.number_input("x2", key="koef_x2", value=0.0)
    with col3:
        koefisien_x3 = st.number_input("x3", key="koef_x3", value=0.0)
    with col4:
        koefisien_x4 = st.number_input("x4", key="koef_x4", value=0.0)
    with col5:
        koefisien_x5 = st.number_input("x5", key="koef_x5", value=0.0)

    st.header("Masukkan Koefisien Kendala Pertama :")
    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_kendala1_x1 = st.number_input("x1", key="koef_kendala1_x1", value=0.0)
    with col2:
        koefisien_kendala1_x2 = st.number_input("x2", key="koef_kendala1_x2", value=0.0)
    with col3:
        koefisien_kendala1_x3 = st.number_input("x3", key="koef_kendala1_x3", value=0.0)
    with col4:
        koefisien_kendala1_x4 = st.number_input("x4", key="koef_kendala1_x4", value=0.0)
    with col5:
        koefisien_kendala1_x5 = st.number_input("x5", key="koef_kendala1_x5", value=0.0)
    batas_kendala1 = st.number_input("Batas Kendala Pertama", key="batas_kendala1", value=0.0)

    st.header("Masukkan Koefisien Kendala Kedua :")
    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_kendala2_x1 = st.number_input("x1", key="koef_kendala2_x1", value=0.0)
    with col2:
        koefisien_kendala2_x2 = st.number_input("x2", key="koef_kendala2_x2", value=0.0)
    with col3:
        koefisien_kendala2_x3 = st.number_input("x3", key="koef_kendala2_x3", value=0.0)
    with col4:
        koefisien_kendala2_x4 = st.number_input("x4", key="koef_kendala2_x4", value=0.0)
    with col5:
        koefisien_kendala2_x5 = st.number_input("x5", key="koef_kendala2_x5", value=0.0)
    batas_kendala2 = st.number_input("Batas Kendala Kedua", key="batas_kendala2", value=0.0)

    st.header("Masukkan Koefisien Kendala Ketiga :")
    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_kendala3_x1 = st.number_input("x1", key="koef_kendala3_x1", value=0.0)
    with col2:
        koefisien_kendala3_x2 = st.number_input("x2", key="koef_kendala3_x2", value=0.0)
    with col3:
        koefisien_kendala3_x3 = st.number_input("x3", key="koef_kendala3_x3", value=0.0)
    with col4:
        koefisien_kendala3_x4 = st.number_input("x4", key="koef_kendala3_x4", value=0.0)
    with col5:
        koefisien_kendala3_x5 = st.number_input("x5", key="koef_kendala3_x5", value=0.0)
    batas_kendala3 = st.number_input("Batas Kendala Ketiga", key="batas_kendala3", value=0.0)

    st.header("Masukkan Koefisien Kendala Keempat :")

```

```

col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala4_x1 = st.number_input("x1", key="koef_kendala4_x1", value=0.0)
with col2:
    koefisien_kendala4_x2 = st.number_input("x2", key="koef_kendala4_x2", value=0.0)
with col3:
    koefisien_kendala4_x3 = st.number_input("x3", key="koef_kendala4_x3", value=0.0)
with col4:
    koefisien_kendala4_x4 = st.number_input("x4", key="koef_kendala4_x4", value=0.0)
with col5:
    koefisien_kendala4_x5 = st.number_input("x5", key="koef_kendala4_x5", value=0.0)
batas_kendala4 = st.number_input("Batas Kendala Keempat", key="batas_kendala4", value=0.0)

st.header("Masukkan Koefisien Kendala Kelima :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala5_x1 = st.number_input("x1", key="koef_kendala5_x1", value=0.0)
with col2:
    koefisien_kendala5_x2 = st.number_input("x2", key="koef_kendala5_x2", value=0.0)
with col3:
    koefisien_kendala5_x3 = st.number_input("x3", key="koef_kendala5_x3", value=0.0)
with col4:
    koefisien_kendala5_x4 = st.number_input("x4", key="koef_kendala5_x4", value=0.0)
with col5:
    koefisien_kendala5_x5 = st.number_input("x5", key="koef_kendala5_x5", value=0.0)
batas_kendala5 = st.number_input("Batas Kendala Kelima", key="batas_kendala5", value=0.0)

st.header("Masukkan Koefisien Kendala Keenam :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala6_x1 = st.number_input("x1", key="koef_kendala6_x1", value=0.0)
with col2:
    koefisien_kendala6_x2 = st.number_input("x2", key="koef_kendala6_x2", value=0.0)
with col3:
    koefisien_kendala6_x3 = st.number_input("x3", key="koef_kendala6_x3", value=0.0)
with col4:
    koefisien_kendala6_x4 = st.number_input("x4", key="koef_kendala6_x4", value=0.0)
with col5:
    koefisien_kendala6_x5 = st.number_input("x5", key="koef_kendala6_x5", value=0.0)
batas_kendala6 = st.number_input("Batas Kendala Keenam", key="batas_kendala6", value=0.0)

st.header("Masukkan Koefisien Kendala Ketujuh :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala7_x1 = st.number_input("x1", key="koef_kendala7_x1", value=0.0)
with col2:
    koefisien_kendala7_x2 = st.number_input("x2", key="koef_kendala7_x2", value=0.0)
with col3:
    koefisien_kendala7_x3 = st.number_input("x3", key="koef_kendala7_x3", value=0.0)
with col4:
    koefisien_kendala7_x4 = st.number_input("x4", key="koef_kendala7_x4", value=0.0)
with col5:
    koefisien_kendala7_x5 = st.number_input("x5", key="koef_kendala7_x5", value=0.0)
batas_kendala7 = st.number_input("Batas Kendala Ketujuh", key="batas_kendala7", value=0.0)

st.header("Masukkan Koefisien Kendala Kedelapan :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala8_x1 = st.number_input("x1", key="koef_kendala8_x1", value=0.0)
with col2:
    koefisien_kendala8_x2 = st.number_input("x2", key="koef_kendala8_x2", value=0.0)
with col3:
    koefisien_kendala8_x3 = st.number_input("x3", key="koef_kendala8_x3", value=0.0)
with col4:
    koefisien_kendala8_x4 = st.number_input("x4", key="koef_kendala8_x4", value=0.0)
with col5:
    koefisien_kendala8_x5 = st.number_input("x5", key="koef_kendala8_x5", value=0.0)
batas_kendala8 = st.number_input("Batas Kendala Kedelapan", key="batas_kendala8", value=0.0)

st.header("Masukkan Koefisien Kendala Kesembilan :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala9_x1 = st.number_input("x1", key="koef_kendala9_x1", value=0.0)
with col2:
    koefisien_kendala9_x2 = st.number_input("x2", key="koef_kendala9_x2", value=0.0)
with col3:
    koefisien_kendala9_x3 = st.number_input("x3", key="koef_kendala9_x3", value=0.0)
with col4:
    koefisien_kendala9_x4 = st.number_input("x4", key="koef_kendala9_x4", value=0.0)
with col5:
    koefisien_kendala9_x5 = st.number_input("x5", key="koef_kendala9_x5", value=0.0)
batas_kendala9 = st.number_input("Batas Kendala Kesembilan", key="batas_kendala9", value=0.0)

```



```

if st.button("Hitung Solusi"):
    calculate_solution_cutting_plane(koefisien_x1, koefisien_x2, koefisien_x3, koefisien_x4, koefisien_x5,
        koefisien_kendala1_x1, koefisien_kendala1_x2, koefisien_kendala1_x3, koefisien_kendala1_x4, koefisien_kendala
        koefisien_kendala2_x1, koefisien_kendala2_x2, koefisien_kendala2_x3, koefisien_kendala2_x4, koefisien_kendala
        koefisien_kendala3_x1, koefisien_kendala3_x2, koefisien_kendala3_x3, koefisien_kendala3_x4, koefisien_kendala
        koefisien_kendala4_x1, koefisien_kendala4_x2, koefisien_kendala4_x3, koefisien_kendala4_x4, koefisien_kendala
        koefisien_kendala5_x1, koefisien_kendala5_x2, koefisien_kendala5_x3, koefisien_kendala5_x4, koefisien_kendala
        koefisien_kendala6_x1, koefisien_kendala6_x2, koefisien_kendala6_x3, koefisien_kendala6_x4, koefisien_kendala
        koefisien_kendala7_x1, koefisien_kendala7_x2, koefisien_kendala7_x3, koefisien_kendala7_x4, koefisien_kendala
        koefisien_kendala8_x1, koefisien_kendala8_x2, koefisien_kendala8_x3, koefisien_kendala8_x4, koefisien_kendala
        koefisien_kendala9_x1, koefisien_kendala9_x2, koefisien_kendala9_x3, koefisien_kendala9_x4, koefisien_kendala
    )

def calculate_solution_cutting_plane(koefisien_x1, koefisien_x2, koefisien_x3, koefisien_x4, koefisien_x5,
    koefisien_kendala1_x1, koefisien_kendala1_x2, koefisien_kendala1_x3, koefisien_kendala1_x4, koefisien_kendala
    koefisien_kendala2_x1, koefisien_kendala2_x2, koefisien_kendala2_x3, koefisien_kendala2_x4, koefisien_kendala
    koefisien_kendala3_x1, koefisien_kendala3_x2, koefisien_kendala3_x3, koefisien_kendala3_x4, koefisien_kendala
    koefisien_kendala4_x1, koefisien_kendala4_x2, koefisien_kendala4_x3, koefisien_kendala4_x4, koefisien_kendala
    koefisien_kendala5_x1, koefisien_kendala5_x2, koefisien_kendala5_x3, koefisien_kendala5_x4, koefisien_kendala
    koefisien_kendala6_x1, koefisien_kendala6_x2, koefisien_kendala6_x3, koefisien_kendala6_x4, koefisien_kendala
    koefisien_kendala7_x1, koefisien_kendala7_x2, koefisien_kendala7_x3, koefisien_kendala7_x4, koefisien_kendala
    koefisien_kendala8_x1, koefisien_kendala8_x2, koefisien_kendala8_x3, koefisien_kendala8_x4, koefisien_kendala
    koefisien_kendala9_x1, koefisien_kendala9_x2, koefisien_kendala9_x3, koefisien_kendala9_x4, koefisien_kendala

# Membuat model baru
n = Model("cutting-plane")

# Membuat variabel-variabel
x1 = n.addVar(vtype=GRB.INTEGER, name="x1")
x2 = n.addVar(vtype=GRB.INTEGER, name="x2")
x3 = n.addVar(vtype=GRB.INTEGER, name="x3")
x4 = n.addVar(vtype=GRB.INTEGER, name="x4")
x5 = n.addVar(vtype=GRB.INTEGER, name="x5")

# Menetapkan fungsi tujuan berdasarkan koefisien yang dimasukkan pengguna
n.setObjective(koefisien_x1 * x1 + koefisien_x2 * x2 + koefisien_x3 * x3 + koefisien_x4 * x4 + koefisien_x5 * x5, GRB.MAXIMIZE)

# Menambahkan kendala pertama
n.addConstr(koefisien_kendala1_x1 * x1 + koefisien_kendala1_x2 * x2 + koefisien_kendala1_x3 * x3 + koefisien_kendala1_x4 * x4 + koefi

# Menambahkan kendala kedua
n.addConstr(koefisien_kendala2_x1 * x1 + koefisien_kendala2_x2 * x2 + koefisien_kendala2_x3 * x3 + koefisien_kendala2_x4 * x4 + koefi

# Menambahkan kendala ketiga
n.addConstr(koefisien_kendala3_x1 * x1 + koefisien_kendala3_x2 * x2 + koefisien_kendala3_x3 * x3 + koefisien_kendala3_x4 * x4 + koefi

# Menambahkan kendala keempat
n.addConstr(koefisien_kendala4_x1 * x1 + koefisien_kendala4_x2 * x2 + koefisien_kendala4_x3 * x3 + koefisien_kendala4_x4 * x4 + koefi

# Menambahkan kendala kelima
n.addConstr(koefisien_kendala5_x1 * x1 + koefisien_kendala5_x2 * x2 + koefisien_kendala5_x3 * x3 + koefisien_kendala5_x4 * x4 + koefi

# Menambahkan kendala keenam
n.addConstr(koefisien_kendala6_x1 * x1 + koefisien_kendala6_x2 * x2 + koefisien_kendala6_x3 * x3 + koefisien_kendala6_x4 * x4 + koefi

# Menambahkan kendala ketujuh
n.addConstr(koefisien_kendala7_x1 * x1 + koefisien_kendala7_x2 * x2 + koefisien_kendala7_x3 * x3 + koefisien_kendala7_x4 * x4 + koefi

# Menambahkan kendala kedelapan
n.addConstr(koefisien_kendala8_x1 * x1 + koefisien_kendala8_x2 * x2 + koefisien_kendala8_x3 * x3 + koefisien_kendala8_x4 * x4 + koefi

# Menambahkan kendala kesembilan
n.addConstr(koefisien_kendala9_x1 * x1 + koefisien_kendala9_x2 * x2 + koefisien_kendala9_x3 * x3 + koefisien_kendala9_x4 * x4 + koefi

# Menyelesaikan relaksasi pemrograman linier awal
n.optimize()

# Melakukan iterasi hingga ditemukan solusi bilangan bulat
while True:
    # Mendapatkan nilai solusi saat ini
    x1_val = x1.x
    x2_val = x2.x
    x3_val = x3.x
    x4_val = x4.x
    x5_val = x5.x

    # Memeriksa apakah solusi merupakan bilangan bulat
    if all(np.isclose(x_val, round(x_val)) for x_val in [x1_val, x2_val, x3_val, x4_val, x5_val]):
        break

    # Menambahkan kendala baru untuk memotong solusi saat ini
    n.addConstr(v1 - round(v1_val) + v2 - round(v2_val) + v3 - round(v3_val) + v4 - round(v4_val) + v5 - round(v5_val) <= -1)

```

```

# Menyelesaikan kembali relaksasi pemrograman linier
m.optimize()
st.header("Solusi Optimal Cutting Plane :")

z = (koefisien_x1 * x1.x) + (koefisien_x2 * x2.x) + (koefisien_x3 * x3.x) + (koefisien_x4 * x4.x) + (koefisien_x5 * x5.x)

col1, col2, col3, col4, col5= st.columns(5)
with col1:
    st.success(f"x1 = {x1.x}")
with col2:
    st.success(f"x2 = {x2.x}")
with col3:
    st.success(f"x3 = {x3.x}")
with col4:
    st.success(f"x4 = {x4.x}")
with col5:
    st.success(f"x5 = {x5.x}")

st.success(f"Hasil Optimal : {z}")

# ----- FUNGSI branch-and-bound ----- #
def branch_and_bound_optimization():

    st.header("Metode Branch and Bound")
    #a1 = "Pie Susu Rasa Original"
    #a2 = "Pie Susu Rasa Coklat"
    #a3 = "Pie Susu Rasa Keju"
    #a4 = "Pie Susu Rasa Coklat Keju"
    #a5 = "Pie Susu Rasa Strawberry"
    #col1, col2, col3, col4, col5= st.columns(5)
    #with col1:
    #    #st.success(f"x1 = {a1}")
    #with col2:
    #    #st.success(f"x2 = {a2}")
    #with col3:
    #    #st.success(f"x3 = {a3}")
    #with col4:
    #    #st.success(f"x4 = {a4}")
    #with col5:
    #    #st.success(f"x5 = {a5}")
    st.header("Masukkan Koefisien Fungsi Tujuan:")

    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_x1 = st.number_input("x1", key="koef_x1", value=0.0)
    with col2:
        koefisien_x2 = st.number_input("x2", key="koef_x2", value=0.0)
    with col3:
        koefisien_x3 = st.number_input("x3", key="koef_x3", value=0.0)
    with col4:
        koefisien_x4 = st.number_input("x4", key="koef_x4", value=0.0)
    with col5:
        koefisien_x5 = st.number_input("x5", key="koef_x5", value=0.0)

    st.header("Masukkan Koefisien Kendala Pertama :")
    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_kendala1_x1 = st.number_input("x1", key="koef_kendala1_x1", value=0.0)
    with col2:
        koefisien_kendala1_x2 = st.number_input("x2", key="koef_kendala1_x2", value=0.0)
    with col3:
        koefisien_kendala1_x3 = st.number_input("x3", key="koef_kendala1_x3", value=0.0)
    with col4:
        koefisien_kendala1_x4 = st.number_input("x4", key="koef_kendala1_x4", value=0.0)
    with col5:
        koefisien_kendala1_x5 = st.number_input("x5", key="koef_kendala1_x5", value=0.0)
    batas_kendala1 = st.number_input("Batas Kendala Pertama", key="batas_kendala1", value=0.0)

    st.header("Masukkan Koefisien Kendala Kedua :")
    col1, col2, col3, col4, col5= st.columns(5)
    with col1:
        koefisien_kendala2_x1 = st.number_input("x1", key="koef_kendala2_x1", value=0.0)
    with col2:
        koefisien_kendala2_x2 = st.number_input("x2", key="koef_kendala2_x2", value=0.0)
    with col3:
        koefisien_kendala2_x3 = st.number_input("x3", key="koef_kendala2_x3", value=0.0)
    with col4:
        koefisien_kendala2_x4 = st.number_input("x4", key="koef_kendala2_x4", value=0.0)
    with col5:
        koefisien_kendala2_x5 = st.number_input("x5", key="koef_kendala2_x5", value=0.0)
    batas_kendala2 = st.number_input("Batas Kendala Kedua", key="batas_kendala2", value=0.0)

```

```

st.header("Masukkan Koefisien Kendala Ketiga :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala3_x1 = st.number_input("x1", key="koef_kendala3_x1", value=0.0)
with col2:
    koefisien_kendala3_x2 = st.number_input("x2", key="koef_kendala3_x2", value=0.0)
with col3:
    koefisien_kendala3_x3 = st.number_input("x3", key="koef_kendala3_x3", value=0.0)
with col4:
    koefisien_kendala3_x4 = st.number_input("x4", key="koef_kendala3_x4", value=0.0)
with col5:
    koefisien_kendala3_x5 = st.number_input("x5", key="koef_kendala3_x5", value=0.0)
batas_kendala3 = st.number_input("Batas Kendala Ketiga", key="batas_kendala3", value=0.0)

st.header("Masukkan Koefisien Kendala Keempat :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala4_x1 = st.number_input("x1", key="koef_kendala4_x1", value=0.0)
with col2:
    koefisien_kendala4_x2 = st.number_input("x2", key="koef_kendala4_x2", value=0.0)
with col3:
    koefisien_kendala4_x3 = st.number_input("x3", key="koef_kendala4_x3", value=0.0)
with col4:
    koefisien_kendala4_x4 = st.number_input("x4", key="koef_kendala4_x4", value=0.0)
with col5:
    koefisien_kendala4_x5 = st.number_input("x5", key="koef_kendala4_x5", value=0.0)
batas_kendala4 = st.number_input("Batas Kendala Keempat", key="batas_kendala4", value=0.0)

st.header("Masukkan Koefisien Kendala Kelima :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala5_x1 = st.number_input("x1", key="koef_kendala5_x1", value=0.0)
with col2:
    koefisien_kendala5_x2 = st.number_input("x2", key="koef_kendala5_x2", value=0.0)
with col3:
    koefisien_kendala5_x3 = st.number_input("x3", key="koef_kendala5_x3", value=0.0)
with col4:
    koefisien_kendala5_x4 = st.number_input("x4", key="koef_kendala5_x4", value=0.0)
with col5:
    koefisien_kendala5_x5 = st.number_input("x5", key="koef_kendala5_x5", value=0.0)
batas_kendala5 = st.number_input("Batas Kendala Kelima", key="batas_kendala5", value=0.0)

st.header("Masukkan Koefisien Kendala Keenam :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala6_x1 = st.number_input("x1", key="koef_kendala6_x1", value=0.0)
with col2:
    koefisien_kendala6_x2 = st.number_input("x2", key="koef_kendala6_x2", value=0.0)
with col3:
    koefisien_kendala6_x3 = st.number_input("x3", key="koef_kendala6_x3", value=0.0)
with col4:
    koefisien_kendala6_x4 = st.number_input("x4", key="koef_kendala6_x4", value=0.0)
with col5:
    koefisien_kendala6_x5 = st.number_input("x5", key="koef_kendala6_x5", value=0.0)
batas_kendala6 = st.number_input("Batas Kendala Keenam", key="batas_kendala6", value=0.0)

st.header("Masukkan Koefisien Kendala Ketujuh :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala7_x1 = st.number_input("x1", key="koef_kendala7_x1", value=0.0)
with col2:
    koefisien_kendala7_x2 = st.number_input("x2", key="koef_kendala7_x2", value=0.0)
with col3:
    koefisien_kendala7_x3 = st.number_input("x3", key="koef_kendala7_x3", value=0.0)
with col4:
    koefisien_kendala7_x4 = st.number_input("x4", key="koef_kendala7_x4", value=0.0)
with col5:
    koefisien_kendala7_x5 = st.number_input("x5", key="koef_kendala7_x5", value=0.0)
batas_kendala7 = st.number_input("Batas Kendala Ketujuh", key="batas_kendala7", value=0.0)

st.header("Masukkan Koefisien Kendala Kedelapan :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala8_x1 = st.number_input("x1", key="koef_kendala8_x1", value=0.0)
with col2:
    koefisien_kendala8_x2 = st.number_input("x2", key="koef_kendala8_x2", value=0.0)
with col3:
    koefisien_kendala8_x3 = st.number_input("x3", key="koef_kendala8_x3", value=0.0)
with col4:
    koefisien_kendala8_x4 = st.number_input("x4", key="koef_kendala8_x4", value=0.0)
with col5:
    koefisien_kendala8_x5 = st.number_input("x5", key="koef_kendala8_x5", value=0.0)

```

```

batas_kendala8 = st.number_input("Batas Kendala Kedelapan", key="batas_kendala8", value=0.0)

st.header("Masukkan Koefisien Kendala Kesembilan :")
col1, col2, col3, col4, col5= st.columns(5)
with col1:
    koefisien_kendala9_x1 = st.number_input("x1", key="koef_kendala9_x1", value=0.0)
with col2:
    koefisien_kendala9_x2 = st.number_input("x2", key="koef_kendala9_x2", value=0.0)
with col3:
    koefisien_kendala9_x3 = st.number_input("x3", key="koef_kendala9_x3", value=0.0)
with col4:
    koefisien_kendala9_x4 = st.number_input("x4", key="koef_kendala9_x4", value=0.0)
with col5:
    koefisien_kendala9_x5 = st.number_input("x5", key="koef_kendala9_x5", value=0.0)
batas_kendala9 = st.number_input("Batas Kendala Kesembilan", key="batas_kendala9", value=0.0)

if st.button("Hitung Solusi"):
    calculate_branch_and_bound(koefisien_x1, koefisien_x2, koefisien_x3, koefisien_x4, koefisien_x5,
        koefisien_kendala1_x1, koefisien_kendala1_x2, koefisien_kendala1_x3, koefisien_kendala1_x4, koefisien_kendala
        koefisien_kendala2_x1, koefisien_kendala2_x2, koefisien_kendala2_x3, koefisien_kendala2_x4, koefisien_kendala
        koefisien_kendala3_x1, koefisien_kendala3_x2, koefisien_kendala3_x3, koefisien_kendala3_x4, koefisien_kendala
        koefisien_kendala4_x1, koefisien_kendala4_x2, koefisien_kendala4_x3, koefisien_kendala4_x4, koefisien_kendala
        koefisien_kendala5_x1, koefisien_kendala5_x2, koefisien_kendala5_x3, koefisien_kendala5_x4, koefisien_kendala
        koefisien_kendala6_x1, koefisien_kendala6_x2, koefisien_kendala6_x3, koefisien_kendala6_x4, koefisien_kendala
        koefisien_kendala7_x1, koefisien_kendala7_x2, koefisien_kendala7_x3, koefisien_kendala7_x4, koefisien_kendala
        koefisien_kendala8_x1, koefisien_kendala8_x2, koefisien_kendala8_x3, koefisien_kendala8_x4, koefisien_kendala
        koefisien_kendala9_x1, koefisien_kendala9_x2, koefisien_kendala9_x3, koefisien_kendala9_x4, koefisien_kendala
    )

def calculate_branch_and_bound(koefisien_x1, koefisien_x2, koefisien_x3, koefisien_x4, koefisien_x5,
    koefisien_kendala1_x1, koefisien_kendala1_x2, koefisien_kendala1_x3, koefisien_kendala1_x4, koefisien_kendala
    koefisien_kendala2_x1, koefisien_kendala2_x2, koefisien_kendala2_x3, koefisien_kendala2_x4, koefisien_kendala
    koefisien_kendala3_x1, koefisien_kendala3_x2, koefisien_kendala3_x3, koefisien_kendala3_x4, koefisien_kendala
    koefisien_kendala4_x1, koefisien_kendala4_x2, koefisien_kendala4_x3, koefisien_kendala4_x4, koefisien_kendala
    koefisien_kendala5_x1, koefisien_kendala5_x2, koefisien_kendala5_x3, koefisien_kendala5_x4, koefisien_kendala
    koefisien_kendala6_x1, koefisien_kendala6_x2, koefisien_kendala6_x3, koefisien_kendala6_x4, koefisien_kendala
    koefisien_kendala7_x1, koefisien_kendala7_x2, koefisien_kendala7_x3, koefisien_kendala7_x4, koefisien_kendala
    koefisien_kendala8_x1, koefisien_kendala8_x2, koefisien_kendala8_x3, koefisien_kendala8_x4, koefisien_kendala
    koefisien_kendala9_x1, koefisien_kendala9_x2, koefisien_kendala9_x3, koefisien_kendala9_x4, koefisien_kendala

# Membuat model baru
n = Model("branch-and-bound")

# Membuat variabel-variabel
x1 = n.addVar(vtype=GRB.INTEGER, name="x1")
x2 = n.addVar(vtype=GRB.INTEGER, name="x2")
x3 = n.addVar(vtype=GRB.INTEGER, name="x3")
x4 = n.addVar(vtype=GRB.INTEGER, name="x4")
x5 = n.addVar(vtype=GRB.INTEGER, name="x5")

# Menetapkan fungsi tujuan berdasarkan koefisien yang dimasukkan pengguna
n.setObjective(koefisien_x1 * x1 + koefisien_x2 * x2 + koefisien_x3 * x3 + koefisien_x4 * x4 + koefisien_x5 * x5, GRB.MAXIMIZE)

# Menambahkan kendala pertama
n.addConstr(koefisien_kendala1_x1 * x1 + koefisien_kendala1_x2 * x2 + koefisien_kendala1_x3 * x3 + koefisien_kendala1_x4 * x4 + koefi

# Menambahkan kendala kedua
n.addConstr(koefisien_kendala2_x1 * x1 + koefisien_kendala2_x2 * x2 + koefisien_kendala2_x3 * x3 + koefisien_kendala2_x4 * x4 + koefi

# Menambahkan kendala ketiga
n.addConstr(koefisien_kendala3_x1 * x1 + koefisien_kendala3_x2 * x2 + koefisien_kendala3_x3 * x3 + koefisien_kendala3_x4 * x4 + koefi

# Menambahkan kendala keempat
n.addConstr(koefisien_kendala4_x1 * x1 + koefisien_kendala4_x2 * x2 + koefisien_kendala4_x3 * x3 + koefisien_kendala4_x4 * x4 + koefi

# Menambahkan kendala kelima
n.addConstr(koefisien_kendala5_x1 * x1 + koefisien_kendala5_x2 * x2 + koefisien_kendala5_x3 * x3 + koefisien_kendala5_x4 * x4 + koefi

# Menambahkan kendala keenam
n.addConstr(koefisien_kendala6_x1 * x1 + koefisien_kendala6_x2 * x2 + koefisien_kendala6_x3 * x3 + koefisien_kendala6_x4 * x4 + koefi

# Menambahkan kendala ketujuh
n.addConstr(koefisien_kendala7_x1 * x1 + koefisien_kendala7_x2 * x2 + koefisien_kendala7_x3 * x3 + koefisien_kendala7_x4 * x4 + koefi

# Menambahkan kendala kedelapan
n.addConstr(koefisien_kendala8_x1 * x1 + koefisien_kendala8_x2 * x2 + koefisien_kendala8_x3 * x3 + koefisien_kendala8_x4 * x4 + koefi

# Menambahkan kendala kesembilan
n.addConstr(koefisien_kendala9_x1 * x1 + koefisien_kendala9_x2 * x2 + koefisien_kendala9_x3 * x3 + koefisien_kendala9_x4 * x4 + koefi

# Menyelesaikan relaksasi pemrograman linier awal

```

```

n.optimize()

# Melakukan iterasi hingga ditemukan solusi bilangan bulat
while True:
    # Mendapatkan nilai solusi saat ini
    x1_val = x1.x
    x2_val = x2.x
    x3_val = x3.x
    x4_val = x4.x
    x5_val = x5.x

    # Memeriksa apakah solusi merupakan bilangan bulat
    if all(np.isclose(x_val, round(x_val)) for x_val in [x1_val, x2_val, x3_val, x4_val, x5_val]):
        break
    # Menambahkan batas pada solusi baru untuk memotong solusi saat ini
    n.addConstr(x1 - round(x1_val) + x2 - round(x2_val) + x3 - round(x3_val) + x4 - round(x4_val) + x5 - round(x5_val) <= -1)

    # Menyelesaikan kembali relaksasi pemrograman linier
    n.optimize()

st.header("Solusi Optimal Branch and Bound :")

z = (koefisien_x1 * x1.x) + (koefisien_x2 * x2.x) + (koefisien_x3 * x3.x) + (koefisien_x4 * x4.x) + (koefisien_x5 * x5.x)

col1, col2, col3, col4, col5 = st.columns(5)
with col1:
    st.success(f"x1 = {x1.x}")
with col2:
    st.success(f"x2 = {x2.x}")
with col3:
    st.success(f"x3 = {x3.x}")
with col4:
    st.success(f"x4 = {x4.x}")
with col5:
    st.success(f"x5 = {x5.x}")

st.success(f"Hasil Optimasi : {z}")

# ----- FUNGSI REFERENSI UNTUK ARTIKEL ----- #

def artikel_cutting_plane_optimization():
    st.subheader("Metode Cutting Plane")
    st.write("Metode Cutting Plane (Metode Bidang Potong) adalah salah satu metode yang digunakan untuk menyelesaikan masalah optimasi ke
    st.write("Prinsip dasar dari metode ini adalah dengan melakukan iterasi dan menghasilkan bidang potong baru yang membatasi solusi yan
    st.write("Metode Cutting Plane sering digunakan dalam permasalahan optimasi kombinatorial yang kompleks dan memiliki banyak variabel,

def artikel_branch_and_bound_optimization():
    st.subheader("Metode Branch and Bound")
    st.write("Metode Branch and Bound (Metode Cabang dan Batas) adalah sebuah teknik yang digunakan untuk menyelesaikan masalah optimasi
    st.write("Prinsip dasar dari metode ini adalah dengan membangun sebuah pohon pencarian (search tree) yang merepresentasikan seluruh k
    st.write("Selama proses pencarian, beberapa simpul pada pohon pencarian dapat dieliminasi berdasarkan evaluasi batas atas dan batas b
    st.write("Metode Branch and Bound sering digunakan dalam permasalahan optimasi kombinatorial yang memiliki struktur pohon pencarian y

# ----- MENU APLIKASI ----- #

pilihan = option_menu(
    menu_title=None, # required
    options=["Home", "Optimasi", "Artikel"], # required
    icons=["house", "book", "envelope"], # optional
    menu_icon="cast", # optional
    default_index=0, # optional
    orientation="horizontal",
    styles={
        "container": {"padding": "0!important", "background-color": "#fafafa"},
        "icon": {"color": "orange", "font-size": "25px"},
        "nav-link": {
            "font-size": "25px",
            "text-align": "left",
            "margin": "0px",
            "--hover-color": "#eee",
        },
        "nav-link-selected": {"background-color": "orange"},
    },
)

# ----- MEMBUAT FUNGSI LOG IN DAN SIGN UP USER ----- #

# Membuat Enkripsi
# digunakan untuk keamanan data admin

import hashlib # Module untuk melakukan penyandian atau enkripsi

def make_hashes(password):
    return hashlib.sha256(str.encode(password)).hexdigest()

```

```

def check_hashes(password,hashed_text):
    if make_hashes(password) == hashed_text:
        return hashed_text
    return False

# ----- MEMBUAT DATABASE ----- #

import sqlite3
conn = sqlite3.connect('data_admin.db')
c = conn.cursor()

# Membuat Fungsi sebagai tabel data admin
def create_usertable():
    c.execute('CREATE TABLE IF NOT EXISTS usertable(username TEXT,password TEXT)')

# Membuat Fungsi sebagai inputan data user
def add_userdata(username,password):
    c.execute('INSERT INTO usertable(username,password) VALUES (?,?)',(username,password))
    conn.commit()

# Membuat Fungsi sebagai login user
def login_user(username,password):
    c.execute('SELECT * FROM usertable WHERE username =? AND password = ?',(username,password))
    data = c.fetchall()
    return data

# Fungsi menampilkan semua data admin/user
def view_all_users():
    c.execute('SELECT * FROM usertable')
    data = c.fetchall()
    return data

# ----- SETTING TAMPILAN TIAP MENU ----- #

if pilihan == "Home":
    st.image('HOME.jpg')
elif pilihan == "Optimasi":
    st.warning("Login Untuk Mengakses Fitur Optimasi ! ")
    menu = ["Login", "SignUp"]
    gambar = st.sidebar.image("atas_optimasi.png", use_column_width=True)
    choice = st.sidebar.selectbox(" ", menu)

    if choice == "Login":
        username = st.sidebar.text_input("Nama Pengguna")
        password = st.sidebar.text_input("Kata Sandi", type='password')
        if st.sidebar.checkbox("Login"):
            # if password == "12345":
            create_usertable()
            hashed_pswd = make_hashes(password)

            result = login_user(username, check_hashes(password, hashed_pswd))

            if result:
                st.success("Masuk sebagai {}".format(username))
                st.sidebar.image("optimasi.png", use_column_width=True)

                task = st.selectbox("Pilih Informasi", ["---- Pilih Menu ----", "Optimasi", "Profil"])
                if task == "---- Pilih Menu ----":
                    st.image("welcome.png")
                elif task == "Profil":
                    st.subheader("Profil Pengguna")
                    user_result = view_all_users()
                    clean_db = pd.DataFrame(user_result, columns=["Nama Pengguna", "Kata Sandi"])
                    st.dataframe(clean_db)
                elif task == "Optimasi":
                    optimasi = st.selectbox("Pilih Metode", ["--- Pilih Metode ---", "Cutting Plane", "Branch and Bound"])
                    if optimasi == "Cutting Plane":
                        cutting_plane_optimization()
                    elif optimasi == "Branch and Bound":
                        branch_and_bound_optimization()
                    else:
                        st.success("Pilih Metode Optimasi")
                else:
                    st.warning("Nama Pengguna/Kata Sandi salah")

    elif choice == "SignUp":
        st.subheader("Buat Akun Baru")
        new_user = st.text_input("Nama Pengguna")
        new_password = st.text_input("Kata Sandi", type='password')

        if st.button("Daftar"):

            create_usertable()
            add_userdata(new_user, make_hashes(new_password))
            st.success("Anda telah berhasil membuat Akun yang valid")
            st.info("Buka Menu Login untuk masuk")

elif pilihan == "Artikel":
    st.title("Artikel: Metode Cutting Plane dan Branch and Bound")
    st.write("Dalam artikel ini, kita akan membahas mengenai dua metode yang sering digunakan dalam menyelesaikan masalah optimasi kombi
artikel_cutting_plane_optimization()
artikel_branch_and_bound_optimization()

```

Lampiran 16. Dokumentasi CV. Dhian Mandiri



Lampiran 17. Halaman-halaman OptimasiApp




USER OPTIMASI

Login ▼

Nama Pengguna
mega

Kata Sandi
.... 👁️

Login



APLIKASI OPTIMASI PENJUALAN PIE SUSU CV DHIAN MANDIRI 🍪

🏠 Home
Optimasi
✉️ Artikel

Login Untuk Mengakses Fitur Optimasi !

Masuk sebagai mega

Pilih Informasi
Optimasi ▼

Pilih Metode
--- Pilih Metode --- ▼

--- Pilih Metode ---

Cutting Plane

Branch and Bound


USER OPTIMASI

Login ▼

Nama Pengguna
mega

Kata Sandi
.... 👁️

Login



Masukkan Koefisien Fungsi Tujuan:

| x1 | x2 | x3 | x4 | x5 | | | | | |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + |

Masukkan Koefisien Kendala Pertama :

| x1 | x2 | x3 | x4 | x5 | | | | | |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + |

Batas Kendala Pertama

0.00 - +

Masukkan Koefisien Kendala Kedua :

| x1 | x2 | x3 | x4 | x5 | | | | | |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + | 0.00 | - + |


Batas Kendala Kedua

0.00 - +

Masukkan Koefisien Kendala Ketiga :

USER OPTIMASI

Login



0.00 - +

Masukkan Koefisien Kendala Kesembilan :

| x1 | x2 | x3 | x4 | x5 |
|----------|----------|----------|----------|----------|
| 0.00 - + | 0.00 - + | 0.00 - + | 0.00 - + | 0.00 - + |

Solusi Optimal Cutting Plane :

x1 = -0.0

x2 = -0.0

x3 = -0.0


x4 = -0.0

x5 = -0.0

Hasil Optimasi : -0.0

USER OPTIMASI

Login



0.00 - +

Masukkan Koefisien Kendala Kesembilan :

| x1 | x2 | x3 | x4 | x5 |
|----------|----------|----------|----------|----------|
| 0.00 - + | 0.00 - + | 0.00 - + | 0.00 - + | 0.00 - + |

Solusi Optimal Branch and Bound :

x1 = -0.0

x2 = -0.0

x3 = -0.0

x4 = -0.0

x5 = -0.0

Hasil Optimasi : -0.0

Riwayat Hidup



Ni Kadek Dwi Mega Duminggan adalah seorang gadis yang lahir di Amlapura pada tanggal 19 Desember 1999. Penulis lahir dari pasangan suami istri Bapak I Gede Simpen dan Ibu Ni Wayan Putu Sriani. Penulis yang biasa disapa Mega berkebangsaan Indonesia dan beragama Hindu. Kini penulis beralamat di Banjar Umanyar Kelod, Desa Ababi, Kecamatan Abang, Provinsi Bali. Penulis menyelesaikan pendidikan taman kanak – kanak di TK Bintang Kejora dan lulus pada tahun 2007. Kemudian penulis melanjutkan pendidikan dasar di SD Insan Mandiri dan lulus pada tahun 2013. Penulis melanjutkan pendidikan di SMP Negeri 2 Amlapura dan lulus pada tahun 2016. Pada tahun 2019, penulis lulus dari SMA Negeri 2 Amlapura jurusan IPA dan melanjutkan ke Strata 1 Jurusan Matematika di Universitas Pendidikan Ganesha. Selama menempuh pendidikan di perguruan tinggi, penulis aktif dalam berbagai kegiatan organisasi. Penulis pernah bergabung dalam kepengurusan BEM FMIPA Undiksha mulai masa bakti 2020 - 2023 dan menjadi Dewan Penasihat Bidang 3 BEM FMIPA Undiksha untuk masa bakti 2022/2023. Sampai pada penulisan skripsi ini, penulis masih terdaftar sebagai mahasiswa Program Studi S1 Matematika di Universitas Pendidikan Ganesha.