

| periode_data | tanggal | pm_10 | pm_duakomalima | so2 | co | o3 | no2 | max | critical | kategori | lokasi_spku |
|--------------|------------|-------|----------------|-----|----|-----|-----|-----|----------|-------------|-------------|
| 202212 | 44926.625 | 54 | 73 | 56 | 24 | 23 | 24 | 73 | PM2,5 | SEDANG | DKI4 |
| 202212 | 12/30/2022 | 40 | 64 | 57 | 21 | 17 | 24 | 64 | PM2,5 | SEDANG | DKI4 |
| 202207 | 7/6/2022 | 75 | 129 | 45 | 25 | 71 | 26 | 129 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202207 | 7/5/2022 | 66 | 110 | 47 | 16 | 61 | 23 | 110 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202207 | 7/4/2022 | 56 | 78 | 49 | 11 | 60 | 13 | 78 | PM2,5 | SEDANG | DKI4 |
| 202207 | 7/3/2022 | 78 | 126 | 48 | 17 | 126 | 25 | 126 | PM2,5 | TIDAK SEHAT | DKI2 |
| 202207 | 7/2/2022 | 81 | 137 | 47 | 18 | 106 | 29 | 137 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/1/2022 | 68 | 109 | 50 | 12 | 91 | 19 | 109 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/31/2022 | 85 | 148 | 51 | 25 | 74 | 37 | 148 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/30/2022 | 59 | 84 | 50 | 15 | 56 | 29 | 84 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/29/2022 | 58 | 82 | 49 | 16 | 55 | 29 | 82 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/28/2022 | 64 | 85 | 49 | 17 | 56 | 30 | 85 | PM2,5 | SEDANG | DKI5 |
| 202208 | 8/27/2022 | 80 | 130 | 50 | 25 | 57 | 37 | 130 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/26/2022 | 76 | 119 | 53 | 19 | 53 | 31 | 119 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/25/2022 | 64 | 98 | 50 | 12 | 66 | 19 | 98 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/24/2022 | 71 | 119 | 50 | 15 | 82 | 20 | 119 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/23/2022 | 76 | 116 | 49 | 17 | 81 | 27 | 116 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/22/2022 | 57 | 78 | 49 | 13 | 79 | 22 | 79 | O3 | SEDANG | DKI2 |
| 202208 | 8/21/2022 | 59 | 101 | 49 | 13 | 65 | 17 | 101 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/20/2022 | 76 | 117 | 50 | 14 | 69 | 18 | 117 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/19/2022 | 70 | 105 | 49 | 14 | 66 | 26 | 105 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/18/2022 | 64 | 89 | 49 | 25 | 84 | 28 | 89 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/17/2022 | 55 | 78 | 48 | 17 | 108 | 25 | 108 | O3 | TIDAK SEHAT | DKI2 |
| 202208 | 8/16/2022 | 61 | 89 | 51 | 15 | 181 | 33 | 181 | O3 | TIDAK SEHAT | DKI2 |
| 202208 | 8/15/2022 | 64 | 84 | 50 | 17 | 63 | 28 | 84 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/14/2022 | 68 | 93 | 50 | 14 | 80 | 20 | 93 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/13/2022 | 58 | 77 | 48 | 21 | 76 | 36 | 77 | PM2,5 | SEDANG | DKI5 |
| 202208 | 8/12/2022 | 65 | 94 | 49 | 17 | 97 | 25 | 97 | O3 | SEDANG | DKI2 |

| Klasifikasi Kualitas Udara | | | | | | | | | | | |
|----------------------------|-----------|------------|------|--------|-----------------|-----|-----|---------|--------|-------------|------|
| Periode | Tanggal | Persentase | Mean | Median | Standar Deviasi | Min | Max | Kondisi | Indeks | Klasifikasi | Kode |
| 202208 | 8/11/2022 | 74 | 107 | 52 | 19 | 80 | 27 | 107 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/10/2022 | 73 | 116 | 49 | 19 | 82 | 29 | 116 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/9/2022 | 61 | 88 | 50 | 14 | 103 | 21 | 103 | O3 | TIDAK SEHAT | DKI2 |
| 202208 | 8/8/2022 | 60 | 84 | 48 | 18 | 97 | 27 | 97 | O3 | SEDANG | DKI2 |
| 202208 | 8/7/2022 | 76 | 119 | 50 | 18 | 114 | 29 | 119 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/6/2022 | 69 | 101 | 49 | 19 | 87 | 29 | 101 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/5/2022 | 60 | 82 | 47 | 17 | 79 | 26 | 82 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/4/2022 | 69 | 99 | 48 | 15 | 82 | 20 | 99 | PM2,5 | SEDANG | DKI4 |
| 202208 | 8/3/2022 | 82 | 141 | 51 | 19 | 129 | 24 | 141 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202208 | 8/2/2022 | 67 | 113 | 50 | 15 | 84 | 28 | 113 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/1/2022 | 83 | 130 | 51 | 15 | 42 | 25 | 130 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/30/2022 | 71 | 103 | 51 | 14 | 45 | 23 | 103 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/29/2022 | 62 | 100 | 51 | 14 | 50 | 21 | 100 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/28/2022 | 62 | 92 | 51 | 13 | 55 | 24 | 92 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/27/2022 | 63 | 86 | 51 | 14 | 58 | 26 | 86 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/26/2022 | 57 | 79 | 51 | 14 | 56 | 26 | 79 | PM2,5 | SEDANG | DKI5 |
| 202209 | 9/25/2022 | 58 | 94 | 50 | 14 | 48 | 25 | 94 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/24/2022 | 57 | 83 | 50 | 17 | 39 | 33 | 83 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/23/2022 | 73 | 97 | 50 | 24 | 50 | 45 | 97 | PM2,5 | SEDANG | DKI2 |
| 202209 | 9/22/2022 | 63 | 90 | 50 | 16 | 37 | 24 | 90 | PM2,5 | SEDANG | DKI5 |
| 202209 | 9/21/2022 | 69 | 112 | 50 | 17 | 42 | 32 | 112 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/20/2022 | 66 | 110 | 51 | 21 | 37 | 41 | 110 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/19/2022 | 70 | 113 | 51 | 17 | 46 | 28 | 113 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/18/2022 | 72 | 113 | 51 | 21 | 43 | 33 | 113 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/17/2022 | 70 | 103 | 51 | 19 | 49 | 35 | 103 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/16/2022 | 62 | 100 | 51 | 18 | 52 | 33 | 100 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/15/2022 | 78 | 117 | 51 | 26 | 34 | 39 | 117 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/14/2022 | 67 | 113 | 53 | 18 | 42 | 38 | 113 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/13/2022 | 59 | 81 | 52 | 18 | 45 | 32 | 81 | PM2,5 | SEDANG | DKI1 |

| | | | | | | | | | | | | |
|--------|------------|----|--|-----|----|----|----|----|-----|-------|-------------|------|
| 202209 | 9/12/2022 | 53 | | 79 | 52 | 18 | 35 | 27 | 79 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/11/2022 | 64 | | 88 | 51 | 20 | 37 | 34 | 88 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/10/2022 | 56 | | 72 | 48 | 22 | 41 | 39 | 72 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/9/2022 | 71 | | 91 | 49 | 28 | 32 | 43 | 91 | PM2,5 | SEDANG | DKI5 |
| 202209 | 9/8/2022 | 61 | | 87 | 48 | 26 | 32 | 45 | 87 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/7/2022 | 55 | | 79 | 49 | 15 | 38 | 21 | 79 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/6/2022 | 63 | | 86 | 51 | 12 | 43 | 17 | 86 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/5/2022 | 59 | | 105 | 51 | 15 | 45 | 23 | 105 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/4/2022 | 42 | | 76 | 50 | 9 | 33 | 14 | 76 | PM2,5 | SEDANG | DKI4 |
| 202209 | 9/3/2022 | 64 | | 102 | 50 | 18 | 37 | 31 | 102 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202209 | 9/2/2022 | 71 | | 108 | 51 | 21 | 35 | 32 | 108 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202210 | 10/26/2022 | 39 | | 43 | 51 | 11 | 27 | 17 | 51 | SO2 | SEDANG | DKI4 |
| 202210 | 10/25/2022 | 27 | | 53 | 51 | 9 | 30 | 19 | 53 | PM2,5 | SEDANG | DKI2 |
| 202210 | 10/24/2022 | 41 | | 57 | 50 | 10 | 31 | 18 | 57 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/23/2022 | 52 | | 66 | 51 | 11 | 45 | 21 | 66 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/22/2022 | 58 | | 82 | 51 | 19 | 39 | 41 | 82 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/21/2022 | 52 | | 67 | 50 | 16 | 31 | 27 | 67 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/20/2022 | 67 | | 88 | 51 | 28 | 47 | 45 | 88 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/19/2022 | 64 | | 92 | 51 | 22 | 42 | 44 | 92 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/18/2022 | 59 | | 79 | 50 | 16 | 45 | 35 | 79 | PM2,5 | SEDANG | DKI1 |
| 202210 | 10/17/2022 | 56 | | 85 | 51 | 13 | 54 | 25 | 85 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/16/2022 | 62 | | 93 | 51 | 19 | 52 | 36 | 93 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/15/2022 | 55 | | 78 | 51 | 13 | 58 | 27 | 78 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/14/2022 | 67 | | 94 | 50 | 28 | 47 | 45 | 94 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/13/2022 | 63 | | 91 | 52 | 17 | 54 | 36 | 91 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/12/2022 | 70 | | 97 | 54 | 27 | 44 | 42 | 97 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/11/2022 | 77 | | 126 | 51 | 23 | 59 | 45 | 126 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202210 | 10/10/2022 | 54 | | 74 | 50 | 14 | 38 | 25 | 74 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/9/2022 | 58 | | 95 | 50 | 24 | 39 | 35 | 95 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/8/2022 | 35 | | 61 | 50 | 17 | 28 | 25 | 61 | PM2,5 | SEDANG | DKI5 |
| 202210 | 10/7/2022 | 51 | | 66 | 53 | 17 | 35 | 34 | 66 | PM2,5 | SEDANG | DKI1 |
| 202210 | 10/6/2022 | 61 | | 89 | 51 | 20 | 39 | 32 | 89 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/5/2022 | 51 | | 68 | 50 | 22 | 36 | 42 | 68 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/4/2022 | 67 | | 98 | 51 | 15 | 40 | 33 | 98 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/3/2022 | 56 | | 76 | 51 | 18 | 38 | 35 | 76 | PM2,5 | SEDANG | DKI5 |
| 202210 | 10/2/2022 | 54 | | 79 | 50 | 12 | 43 | 19 | 79 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/1/2022 | 80 | | 128 | 52 | 14 | 39 | 21 | 128 | PM2,5 | TIDAK SEHAT | DKI4 |
| 202210 | 10/27/2022 | 41 | | 66 | 51 | 18 | 35 | 27 | 66 | PM2,5 | SEDANG | DKI4 |
| 202210 | 10/28/2022 | 54 | | 77 | 51 | 16 | 33 | 32 | 77 | PM2,5 | SEDANG | DKI4 |

DATA ASLI

| U1 | U2 | U1^2 | U2^2 | Jarak D1 | Jarak D2 | F.Objektif |
|-------------|-------------|-------------|-------------|-------------|----------|-------------|
| 0.465517241 | 0.285714286 | 0.916666667 | 0.789473684 | 0.036585366 | 0.34375 | 2.837707244 |
| 0.224137931 | 0.2 | 1 | 0.631578947 | 0 | 0.34375 | 2.399466878 |
| 0.827586207 | 0.819047619 | 0 | 0.842105263 | 0.329268293 | 0.40625 | 3.224257382 |
| 0.672413793 | 0.638095238 | 0.166666667 | 0.368421053 | 0.268292683 | 0.3125 | 2.426389433 |
| 0.5 | 0.333333333 | 0.333333333 | 0.105263158 | 0.262195122 | 0 | 1.534124947 |
| 0.879310345 | 0.79047619 | 0.25 | 0.421052632 | 0.664634146 | 0.375 | 3.380473313 |
| 0.931034483 | 0.895238095 | 0.166666667 | 0.473684211 | 0.542682927 | 0.5 | 3.509306382 |
| 0.706896552 | 0.628571429 | 0.416666667 | 0.157894737 | 0.451219512 | 0.1875 | 2.548748896 |
| 1 | 1 | 0.5 | 0.842105263 | 0.347560976 | 0.75 | 4.439666239 |
| 0.551724138 | 0.39047619 | 0.416666667 | 0.315789474 | 0.237804878 | 0.5 | 2.412461347 |
| 0.534482759 | 0.371428571 | 0.333333333 | 0.368421053 | 0.231707317 | 0.5 | 2.339373033 |
| 0.637931034 | 0.4 | 0.333333333 | 0.421052632 | 0.237804878 | 0.53125 | 2.561371877 |
| 0.913793103 | 0.828571429 | 0.416666667 | 0.842105263 | 0.243902439 | 0.75 | 3.995038901 |
| 0.844827586 | 0.723809524 | 0.666666667 | 0.526315789 | 0.219512195 | 0.5625 | 3.543631761 |
| 0.637931034 | 0.523809524 | 0.416666667 | 0.157894737 | 0.298780488 | 0.1875 | 2.22258245 |
| 0.75862069 | 0.723809524 | 0.416666667 | 0.315789474 | 0.396341463 | 0.21875 | 2.829977817 |
| 0.844827586 | 0.695238095 | 0.333333333 | 0.421052632 | 0.390243902 | 0.4375 | 3.122195549 |
| 0.517241379 | 0.333333333 | 0.333333333 | 0.210526316 | 0.37804878 | 0.28125 | 2.053733142 |
| 0.551724138 | 0.552380952 | 0.333333333 | 0.210526316 | 0.292682927 | 0.125 | 2.065647666 |
| 0.844827586 | 0.704761905 | 0.416666667 | 0.263157895 | 0.317073171 | 0.15625 | 2.702737223 |
| 0.74137931 | 0.59047619 | 0.333333333 | 0.263157895 | 0.298780488 | 0.40625 | 2.633377217 |
| 0.637931034 | 0.438095238 | 0.333333333 | 0.842105263 | 0.408536585 | 0.46875 | 3.128751454 |
| 0.482758621 | 0.333333333 | 0.25 | 0.421052632 | 0.554878049 | 0.375 | 2.417022634 |
| 0.586206897 | 0.438095238 | 0.5 | 0.315789474 | 1 | 0.625 | 3.465091608 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|---------|-------------|
| 0.637931034 | 0.39047619 | 0.416666667 | 0.421052632 | 0.280487805 | 0.46875 | 2.615364328 |
| 0.706896552 | 0.476190476 | 0.416666667 | 0.263157895 | 0.384146341 | 0.21875 | 2.465807931 |
| 0.534482759 | 0.323809524 | 0.25 | 0.631578947 | 0.359756098 | 0.71875 | 2.818377327 |
| 0.655172414 | 0.485714286 | 0.333333333 | 0.421052632 | 0.487804878 | 0.375 | 2.758077542 |
| 0.810344828 | 0.60952381 | 0.583333333 | 0.526315789 | 0.384146341 | 0.4375 | 3.351164101 |
| 0.793103448 | 0.695238095 | 0.333333333 | 0.526315789 | 0.396341463 | 0.5 | 3.24433213 |
| 0.586206897 | 0.428571429 | 0.416666667 | 0.263157895 | 0.524390244 | 0.25 | 2.46899313 |
| 0.568965517 | 0.39047619 | 0.25 | 0.473684211 | 0.487804878 | 0.4375 | 2.608430796 |
| 0.844827586 | 0.723809524 | 0.416666667 | 0.473684211 | 0.591463415 | 0.5 | 3.550451402 |
| 0.724137931 | 0.552380952 | 0.333333333 | 0.526315789 | 0.426829268 | 0.5 | 3.062997275 |
| 0.568965517 | 0.371428571 | 0.166666667 | 0.421052632 | 0.37804878 | 0.40625 | 2.312412167 |
| 0.724137931 | 0.533333333 | 0.25 | 0.315789474 | 0.396341463 | 0.21875 | 2.438352201 |
| 0.948275862 | 0.933333333 | 0.5 | 0.526315789 | 0.682926829 | 0.34375 | 3.934601814 |
| 0.689655172 | 0.666666667 | 0.416666667 | 0.315789474 | 0.408536585 | 0.46875 | 2.966064565 |
| 0.965517241 | 0.828571429 | 0.5 | 0.315789474 | 0.152439024 | 0.375 | 3.137317168 |
| 0.75862069 | 0.571428571 | 0.5 | 0.263157895 | 0.170731707 | 0.3125 | 2.576438863 |
| 0.603448276 | 0.542857143 | 0.5 | 0.263157895 | 0.201219512 | 0.25 | 2.360682826 |
| 0.603448276 | 0.466666667 | 0.5 | 0.210526316 | 0.231707317 | 0.34375 | 2.356098575 |
| 0.620689655 | 0.40952381 | 0.5 | 0.263157895 | 0.25 | 0.40625 | 2.449621359 |
| 0.517241379 | 0.342857143 | 0.5 | 0.263157895 | 0.237804878 | 0.40625 | 2.267311295 |
| 0.534482759 | 0.485714286 | 0.416666667 | 0.263157895 | 0.18902439 | 0.375 | 2.264045996 |
| 0.517241379 | 0.380952381 | 0.416666667 | 0.421052632 | 0.134146341 | 0.625 | 2.4950594 |
| 0.793103448 | 0.514285714 | 0.416666667 | 0.789473684 | 0.201219512 | 1 | 3.714749026 |
| 0.620689655 | 0.447619048 | 0.416666667 | 0.368421053 | 0.12195122 | 0.34375 | 2.319097642 |
| 0.724137931 | 0.657142857 | 0.416666667 | 0.421052632 | 0.152439024 | 0.59375 | 2.965189111 |
| 0.672413793 | 0.638095238 | 0.5 | 0.631578947 | 0.12195122 | 0.875 | 3.439039198 |
| 0.74137931 | 0.666666667 | 0.5 | 0.421052632 | 0.176829268 | 0.46875 | 2.974677877 |
| 0.775862069 | 0.666666667 | 0.5 | 0.631578947 | 0.158536585 | 0.625 | 3.357644268 |
| 0.74137931 | 0.571428571 | 0.5 | 0.526315789 | 0.195121951 | 0.6875 | 3.221745622 |
| 0.603448276 | 0.542857143 | 0.5 | 0.473684211 | 0.213414634 | 0.625 | 2.958404263 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|---------|-------------|
| 0.879310345 | 0.704761905 | 0.5 | 0.894736842 | 0.103658537 | 0.8125 | 3.894967628 |
| 0.689655172 | 0.666666667 | 0.666666667 | 0.473684211 | 0.152439024 | 0.78125 | 3.430361741 |
| 0.551724138 | 0.361904762 | 0.583333333 | 0.473684211 | 0.170731707 | 0.59375 | 2.735128151 |
| 0.448275862 | 0.342857143 | 0.583333333 | 0.473684211 | 0.109756098 | 0.4375 | 2.395406646 |
| 0.637931034 | 0.428571429 | 0.5 | 0.578947368 | 0.12195122 | 0.65625 | 2.923651051 |
| 0.5 | 0.276190476 | 0.25 | 0.684210526 | 0.146341463 | 0.8125 | 2.669242466 |
| 0.75862069 | 0.457142857 | 0.333333333 | 1 | 0.091463415 | 0.9375 | 3.578060295 |
| 0.586206897 | 0.419047619 | 0.25 | 0.894736842 | 0.091463415 | 1 | 3.241454772 |
| 0.482758621 | 0.342857143 | 0.333333333 | 0.315789474 | 0.12804878 | 0.25 | 1.852787351 |
| 0.620689655 | 0.40952381 | 0.5 | 0.157894737 | 0.158536585 | 0.125 | 1.971644787 |
| 0.551724138 | 0.59047619 | 0.5 | 0.315789474 | 0.170731707 | 0.3125 | 2.441221509 |
| 0.25862069 | 0.314285714 | 0.416666667 | 0 | 0.097560976 | 0.03125 | 1.118384046 |
| 0.637931034 | 0.561904762 | 0.416666667 | 0.473684211 | 0.12195122 | 0.5625 | 2.774637893 |
| 0.75862069 | 0.619047619 | 0.5 | 0.631578947 | 0.109756098 | 0.59375 | 3.212753354 |
| 0.206896552 | 0 | 0.5 | 0.105263158 | 0.06097561 | 0.125 | 0.998135319 |
| 0 | 0.095238095 | 0.5 | 0 | 0.079268293 | 0.1875 | 0.862006388 |
| 0.24137931 | 0.133333333 | 0.416666667 | 0.052631579 | 0.085365854 | 0.15625 | 1.085626743 |
| 0.431034483 | 0.219047619 | 0.5 | 0.105263158 | 0.170731707 | 0.25 | 1.676076967 |
| 0.534482759 | 0.371428571 | 0.5 | 0.526315789 | 0.134146341 | 0.875 | 2.941373461 |
| 0.431034483 | 0.228571429 | 0.416666667 | 0.368421053 | 0.085365854 | 0.4375 | 1.967559484 |
| 0.689655172 | 0.428571429 | 0.5 | 1 | 0.182926829 | 1 | 3.80115343 |
| 0.637931034 | 0.466666667 | 0.5 | 0.684210526 | 0.152439024 | 0.96875 | 3.409997252 |
| 0.551724138 | 0.342857143 | 0.416666667 | 0.368421053 | 0.170731707 | 0.6875 | 2.537900707 |
| 0.5 | 0.4 | 0.5 | 0.210526316 | 0.225609756 | 0.375 | 2.211136072 |
| 0.603448276 | 0.476190476 | 0.5 | 0.526315789 | 0.213414634 | 0.71875 | 3.038119176 |
| 0.482758621 | 0.333333333 | 0.5 | 0.210526316 | 0.25 | 0.4375 | 2.21411827 |
| 0.689655172 | 0.485714286 | 0.416666667 | 1 | 0.182926829 | 1 | 3.774962954 |
| 0.620689655 | 0.457142857 | 0.583333333 | 0.421052632 | 0.225609756 | 0.71875 | 3.026578233 |
| 0.74137931 | 0.514285714 | 0.75 | 0.947368421 | 0.164634146 | 0.90625 | 4.023917592 |
| 0.862068966 | 0.79047619 | 0.5 | 0.736842105 | 0.256097561 | 1 | 4.145484822 |
| 0.465517241 | 0.295238095 | 0.416666667 | 0.263157895 | 0.12804878 | 0.375 | 1.943628679 |
| 0.534482759 | 0.495238095 | 0.416666667 | 0.789473684 | 0.134146341 | 0.6875 | 3.057507546 |
| 0.137931034 | 0.171428571 | 0.416666667 | 0.421052632 | 0.067073171 | 0.375 | 1.589152075 |
| 0.413793103 | 0.219047619 | 0.666666667 | 0.421052632 | 0.109756098 | 0.65625 | 2.486566118 |
| 0.586206897 | 0.438095238 | 0.5 | 0.578947368 | 0.134146341 | 0.59375 | 2.831145845 |
| 0.413793103 | 0.238095238 | 0.416666667 | 0.684210526 | 0.115853659 | 0.90625 | 2.774869193 |
| 0.689655172 | 0.523809524 | 0.5 | 0.315789474 | 0.140243902 | 0.625 | 2.794498072 |
| 0.5 | 0.314285714 | 0.5 | 0.473684211 | 0.12804878 | 0.6875 | 2.603518705 |

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|-------------|-------------|-------------|-------------|-------------|---------|-------------|
| 0.465517241 | 0.342857143 | 0.416666667 | 0.157894737 | 0.158536585 | 0.1875 | 1.728972373 |
| 0.913793103 | 0.80952381 | 0.583333333 | 0.263157895 | 0.134146341 | 0.25 | 2.953954483 |
| 0.24137931 | 0.219047619 | 0.5 | 0.473684211 | 0.109756098 | 0.4375 | 1.981367237 |
| 0.465517241 | 0.323809524 | 0.5 | 0.368421053 | 0.097560976 | 0.59375 | 2.349058793 |
| 0.448275862 | 0.40952381 | 0.5 | 0.315789474 | 0.146341463 | 0.5 | 2.319930609 |
| | | | | | | 0.173469388 |
| | | | | | | |

| (u1)^m | (u2)^m | (u1)^m.X | (u2)^m.X | d1^z | d2^z | u1 Baru | u2 Baru |
|--------|--------|-------------|-------------|----------|----------|----------|----------|
| 0.1 | 0.9 | 0.004655172 | 0.377068966 | 0.416155 | 0.522874 | 0.556824 | 0.443176 |
| 0.2 | 0.8 | 0.008965517 | 0.143448276 | 0.581848 | 0.732843 | 0.557426 | 0.442574 |
| 0.3 | 0.7 | 0.074482759 | 0.405517241 | 0.596828 | 0.484512 | 0.448066 | 0.551934 |
| 0.4 | 0.6 | 0.107586207 | 0.242068966 | 0.203037 | 0.107989 | 0.347203 | 0.652797 |
| 0.5 | 0.5 | 0.125 | 0.125 | 0.471299 | 0.364138 | 0.435865 | 0.564135 |
| 0.6 | 0.4 | 0.316551724 | 0.140689655 | 0.50856 | 0.30976 | 0.378531 | 0.621469 |
| 0.7 | 0.3 | 0.456206897 | 0.083793103 | 0.536418 | 0.368425 | 0.40717 | 0.59283 |
| 0.8 | 0.2 | 0.452413793 | 0.028275862 | 0.340958 | 0.184365 | 0.350956 | 0.649044 |
| 0.9 | 0.1 | 0.81 | 0.01 | 0.6875 | 0.640058 | 0.482132 | 0.517868 |
| 0.1 | 0.9 | 0.005517241 | 0.446896552 | 0.033247 | 0.042207 | 0.559376 | 0.440624 |
| 0.11 | 0.89 | 0.006467241 | 0.423363793 | 0.039213 | 0.050475 | 0.562782 | 0.437218 |
| 0.12 | 0.88 | 0.009186207 | 0.494013793 | 0.02807 | 0.03167 | 0.530131 | 0.469869 |
| 0.13 | 0.87 | 0.015443103 | 0.69165 | 0.443296 | 0.441051 | 0.498731 | 0.501269 |
| 0.14 | 0.86 | 0.016558621 | 0.624834483 | 0.18914 | 0.173218 | 0.478031 | 0.521969 |
| 0.15 | 0.85 | 0.014353448 | 0.460905172 | 0.245477 | 0.141223 | 0.3652 | 0.6348 |
| 0.17 | 0.83 | 0.021924138 | 0.522613793 | 0.2808 | 0.134711 | 0.324206 | 0.675794 |
| 0.18 | 0.82 | 0.027372414 | 0.568062069 | 0.201046 | 0.09446 | 0.319656 | 0.680344 |
| 0.19 | 0.81 | 0.018672414 | 0.339362069 | 0.206164 | 0.137628 | 0.400324 | 0.599676 |
| 0.2 | 0.8 | 0.022058966 | 0.353103448 | 0.281409 | 0.169672 | 0.376145 | 0.623855 |
| 0.21 | 0.79 | 0.037256897 | 0.527256897 | 0.345565 | 0.191371 | 0.356413 | 0.643587 |
| 0.22 | 0.78 | 0.035882759 | 0.451055172 | 0.134375 | 0.055697 | 0.293031 | 0.706969 |
| 0.23 | 0.77 | 0.033746552 | 0.37822931 | 0.20224 | 0.195181 | 0.46984 | 0.53016 |
| 0.24 | 0.76 | 0.027806897 | 0.278841379 | 0.236242 | 0.160371 | 0.404351 | 0.595649 |
| 0.25 | 0.75 | 0.036637931 | 0.329741379 | 0.687392 | 0.558838 | 0.448201 | 0.551799 |
| 0.26 | 0.74 | 0.043124138 | 0.349331034 | 0.026946 | 0.014875 | 0.363506 | 0.636494 |
| 0.27 | 0.73 | 0.051532759 | 0.376705172 | 0.205285 | 0.0924 | 0.310394 | 0.689606 |
| 0.28 | 0.72 | 0.041903446 | 0.277075862 | 0.152542 | 0.197072 | 0.563684 | 0.436316 |
| 0.29 | 0.71 | 0.0551 | 0.330272414 | 0.145511 | 0.051881 | 0.262834 | 0.731766 |
| 0.3 | 0.7 | 0.072931034 | 0.397068966 | 0.145975 | 0.079573 | 0.352799 | 0.647201 |
| 0.31 | 0.69 | 0.076217241 | 0.377596552 | 0.171388 | 0.089266 | 0.342468 | 0.657532 |
| 0.32 | 0.68 | 0.060027586 | 0.27106206 | 0.244274 | 0.128859 | 0.348474 | 0.655126 |
| 0.33 | 0.67 | 0.061960345 | 0.255408621 | 0.152568 | 0.090059 | 0.371182 | 0.628818 |
| 0.34 | 0.66 | 0.097652069 | 0.368006897 | 0.310829 | 0.181121 | 0.36817 | 0.63183 |
| 0.35 | 0.65 | 0.088706897 | 0.305948276 | 0.111484 | 0.047244 | 0.297642 | 0.702358 |
| 0.26 | 0.74 | 0.038462069 | 0.311565517 | 0.153989 | 0.100789 | 0.395595 | 0.604045 |
| 0.37 | 0.63 | 0.099134483 | 0.287410345 | 0.246849 | 0.11338 | 0.314759 | 0.685241 |
| 0.38 | 0.62 | 0.136931034 | 0.364517241 | 0.658034 | 0.44964 | 0.405932 | 0.594068 |
| 0.39 | 0.61 | 0.104896552 | 0.25662069 | 0.136335 | 0.055056 | 0.287662 | 0.712338 |
| 0.4 | 0.6 | 0.154482759 | 0.347586207 | 0.343537 | 0.250822 | 0.422004 | 0.577996 |
| 0.41 | 0.59 | 0.17524138 | 0.264075862 | 0.142425 | 0.083716 | 0.370193 | 0.629807 |
| 0.42 | 0.58 | 0.106448276 | 0.203 | 0.138374 | 0.082565 | 0.373702 | 0.626298 |
| 0.43 | 0.57 | 0.111577586 | 0.196060345 | 0.108767 | 0.071506 | 0.396655 | 0.603345 |
| 0.44 | 0.56 | 0.120165517 | 0.194648276 | 0.068107 | 0.047348 | 0.410099 | 0.589901 |
| 0.45 | 0.55 | 0.104741379 | 0.156465517 | 0.079285 | 0.081328 | 0.50636 | 0.49364 |
| 0.46 | 0.54 | 0.113096552 | 0.155855172 | 0.075115 | 0.056693 | 0.430119 | 0.569881 |
| 0.47 | 0.53 | 0.114258621 | 0.145293103 | 0.022097 | 0.090741 | 0.804168 | 0.195832 |
| 0.48 | 0.52 | 0.182731034 | 0.214455172 | 0.363186 | 0.469022 | 0.563588 | 0.436412 |
| 0.49 | 0.51 | 0.149027586 | 0.161441379 | 0.058986 | 0.047821 | 0.447733 | 0.552267 |
| 0.5 | 0.5 | 0.181034483 | 0.181034483 | 0.070026 | 0.072053 | 0.507134 | 0.492866 |
| 0.51 | 0.49 | 0.174894828 | 0.161446552 | 0.184141 | 0.278911 | 0.602332 | 0.397668 |
| 0.52 | 0.48 | 0.200468966 | 0.170813793 | 0.08103 | 0.05478 | 0.403358 | 0.596642 |
| 0.53 | 0.47 | 0.217939655 | 0.171387931 | 0.120784 | 0.13999 | 0.53558 | 0.46442 |
| 0.54 | 0.46 | 0.216186207 | 0.156875862 | 0.064868 | 0.097371 | 0.600169 | 0.399831 |
| 0.55 | 0.45 | 0.182543103 | 0.122198276 | 0.016534 | 0.049275 | 0.748762 | 0.251238 |
| 0.56 | 0.44 | 0.275751724 | 0.170234483 | 0.418496 | 0.486362 | 0.5375 | 0.4625 |
| 0.57 | 0.43 | 0.224068966 | 0.127517241 | 0.153932 | 0.220649 | 0.589055 | 0.410945 |
| 0.58 | 0.42 | 0.1856 | 0.097324138 | 0.025376 | 0.093273 | 0.786122 | 0.213878 |
| 0.59 | 0.41 | 0.156044828 | 0.075355172 | 0.06179 | 0.124735 | 0.668729 | 0.331271 |
| 0.6 | 0.4 | 0.229655172 | 0.102068966 | 0.034861 | 0.107973 | 0.755932 | 0.244068 |
| 0.61 | 0.39 | 0.18605 | 0.07605 | 0.205263 | 0.327208 | 0.614509 | 0.385491 |
| 0.62 | 0.38 | 0.291613793 | 0.109544828 | 0.499872 | 0.632406 | 0.558526 | 0.441474 |
| 0.63 | 0.37 | 0.232665517 | 0.080251724 | 0.44868 | 0.607498 | 0.575185 | 0.424815 |
| 0.64 | 0.36 | 0.197737931 | 0.062565517 | 0.152974 | 0.14013 | 0.47809 | 0.52191 |
| 0.67 | 0.33 | 0.278627586 | 0.067593103 | 0.276996 | 0.210311 | 0.431578 | 0.568422 |
| 0.68 | 0.32 | 0.255117241 | 0.056496552 | 0.098152 | 0.066199 | 0.40279 | 0.57921 |
| 0.69 | 0.31 | 0.12312931 | 0.024853448 | 0.613821 | 0.58030 | 0.485966 | 0.514034 |
| 0.7 | 0.3 | 0.312586207 | 0.057413793 | 0.022457 | 0.048681 | 0.684322 | 0.315678 |
| 0.71 | 0.29 | 0.38242069 | 0.0638 | 0.097677 | 0.127321 | 0.565875 | 0.434125 |
| 0.72 | 0.28 | 0.107255172 | 0.01622069 | 0.667923 | 0.175398 | 0.51716 | 0.48284 |
| 0.73 | 0.27 | 0 | 0 | 0.820997 | 0.886619 | 0.519271 | 0.480729 |
| 0.74 | 0.26 | 0.13217931 | 0.016317241 | 0.550595 | 0.514328 | 0.509126 | 0.490874 |
| 0.75 | 0.25 | 0.242456897 | 0.026939655 | 0.299425 | 0.292921 | 0.49872 | 0.50128 |
| 0.76 | 0.24 | 0.308717241 | 0.030786207 | 0.123866 | 0.256425 | 0.674287 | 0.325713 |
| 0.77 | 0.23 | 0.255560345 | 0.022801724 | 0.106497 | 0.170498 | 0.615527 | 0.384473 |
| 0.78 | 0.22 | 0.419586207 | 0.0333793 | 0.507399 | 0.658119 | 0.564658 | 0.435342 |
| 0.79 | 0.21 | 0.398132759 | 0.028132759 | 0.232363 | 0.366651 | 0.612091 | 0.387909 |
| 0.8 | 0.2 | 0.353103448 | 0.022068966 | 0.043842 | 0.114691 | 0.723453 | 0.276547 |
| 0.81 | 0.19 | 0.32805 | 0.01805 | 0.104967 | 0.095783 | 0.477126 | 0.522874 |
| 0.82 | 0.18 | 0.405758621 | 0.019551724 | 0.036167 | 0.099033 | 0.732496 | 0.267504 |
| 0.83 | 0.17 | 0.332572414 | 0.013951724 | 0.104185 | 0.112464 | 0.519108 | 0.480892 |
| 0.84 | 0.16 | 0.48662069 | 0.017655172 | 0.509177 | 0.647278 | 0.559708 | 0.440292 |
| 0.85 | 0.15 | 0.448448276 | 0.013965517 | 0.047674 | 0.108055 | 0.693867 | 0.306133 |
| 0.86 | 0.14 | 0.548324138 | 0.014531034 | 0.474882 | 0.609777 | 0.562183 | 0.437817 |
| 0.87 | 0.13 | 0.6525 | 0.014568966 | 0.479106 | 0.53756 | 0.528751 | 0.471249 |
| 0.89 | 0.11 | 0.368736207 | 0.005632759 | 0.113506 | 0.137539 | 0.547866 | 0.452134 |
| 0.9 | 0.1 | 0.432931034 | 0.005344828 | 0.135926 | 0.224606 | 0.622985 | 0.377015 |
| 0.91 | 0.09 | 0.11422069 | 0.00117241 | 0.323949 | 0.424118 | 0.567297 | 0.432703 |
| 0.92 | 0.08 | 0.350234483 | 0.002648276 | 0.142175 | 0.272225 | 0.656915 | 0.343085 |
| 0.93 | 0.07 | 0.507010345 | 0.002872414 | 0.020105 | 0.082905 | 0.804828 | 0.195172 |
| 0.94 | 0.06 | 0.365627586 | 0.001489655 | 0.259121 | 0.134778 | 0.626572 | 0.373248 |
| 0.95 | 0.05 | 0.622413793 | 0.001724138 | 0.047855 | 0.078144 | 0.620195 | 0.379805 |
| 0.96 | 0.04 | 0.4608 | 0.0008 | 0.049989 | 0.151955 | 0.752461 | 0.247539 |
| 0.97 | 0.03 | 0.438005172 | 0.000418966 | 0.251018 | 0.2178 | 0.464572 | 0.535428 |
| 0.98 | 0.02 | 0.877606897 | 0.000365517 | 0.38372 | 0.280389 | 0.422203 | 0.577797 |
| 0.99 | 0.01 | 0.236575862 | 2.41379E-05 | 0.189098 | 0.285119 | 0.601242 | 0.398758 |
| 0.1 | 0.9 | 0.004655172 | 0.377068966 | 0.050051 | 0.13583 | 0.730735 | 0.269265 |
| 0.101 | 0.899 | 0.004572862 | 0.362297 | 0.045923 | 0.091317 | 0.665382 | 0.334618 |

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| U1 | U2 | U1^2 | U2^2 | Jarak D1 | Jarak D2 | F.Objektif |
|---------|---------|-------------|-------------|----------|----------|------------|
| 0.46552 | 0.28571 | 0.916666667 | 0.789473684 | 0.03659 | 0.34375 | 2.83770724 |
| 0.22414 | 0.2 | 1 | 0.631578947 | 0 | 0.34375 | 2.39946688 |
| 0.82759 | 0.81905 | 0 | 0.842105263 | 0.32927 | 0.40625 | 3.22425738 |
| 0.67241 | 0.6381 | 0.166666667 | 0.368421053 | 0.26829 | 0.3125 | 2.42638943 |
| 0.5 | 0.33333 | 0.333333333 | 0.105263158 | 0.2622 | 0 | 1.53412495 |
| 0.87931 | 0.79048 | 0.25 | 0.421052632 | 0.66463 | 0.375 | 3.38047331 |
| 0.93103 | 0.89524 | 0.166666667 | 0.473684211 | 0.54268 | 0.5 | 3.50930638 |
| 0.7069 | 0.62857 | 0.416666667 | 0.157894737 | 0.45122 | 0.1875 | 2.5487489 |
| 1 | 1 | 0.5 | 0.842105263 | 0.34756 | 0.75 | 4.43966624 |
| 0.55172 | 0.39048 | 0.416666667 | 0.315789474 | 0.2378 | 0.5 | 2.41246135 |
| 0.53448 | 0.37143 | 0.333333333 | 0.368421053 | 0.23171 | 0.5 | 2.33937303 |
| 0.63793 | 0.4 | 0.333333333 | 0.421052632 | 0.2378 | 0.53125 | 2.56137188 |
| 0.91379 | 0.82857 | 0.416666667 | 0.842105263 | 0.2439 | 0.75 | 3.9950389 |
| 0.84483 | 0.72381 | 0.666666667 | 0.526315789 | 0.21951 | 0.5625 | 3.54363176 |
| 0.63793 | 0.52381 | 0.416666667 | 0.157894737 | 0.29878 | 0.1875 | 2.22258245 |
| 0.75862 | 0.72381 | 0.416666667 | 0.315789474 | 0.39634 | 0.21875 | 2.82997782 |
| 0.84483 | 0.69524 | 0.333333333 | 0.421052632 | 0.39024 | 0.4375 | 3.12219555 |
| 0.51724 | 0.33333 | 0.333333333 | 0.210526316 | 0.37805 | 0.28125 | 2.05373314 |
| 0.55172 | 0.55238 | 0.333333333 | 0.210526316 | 0.29268 | 0.125 | 2.06564767 |
| 0.84483 | 0.70476 | 0.416666667 | 0.263157895 | 0.31707 | 0.15625 | 2.70273722 |
| 0.74138 | 0.59048 | 0.333333333 | 0.263157895 | 0.29878 | 0.40625 | 2.63337722 |
| 0.63793 | 0.4381 | 0.333333333 | 0.842105263 | 0.40854 | 0.46875 | 3.12875145 |
| 0.48276 | 0.33333 | 0.25 | 0.421052632 | 0.55488 | 0.375 | 2.41702263 |
| 0.58621 | 0.4381 | 0.5 | 0.315789474 | 1 | 0.625 | 3.46509161 |

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|---------|---------|-------------|-------------|---------|---------|------------|
| 0.63793 | 0.39048 | 0.416666667 | 0.421052632 | 0.28049 | 0.46875 | 2.61536433 |
| 0.7069 | 0.47619 | 0.416666667 | 0.263157895 | 0.38415 | 0.21875 | 2.46580793 |
| 0.53448 | 0.32381 | 0.25 | 0.631578947 | 0.35976 | 0.71875 | 2.81837733 |
| 0.65517 | 0.48571 | 0.333333333 | 0.421052632 | 0.4878 | 0.375 | 2.75807754 |
| 0.81034 | 0.60952 | 0.583333333 | 0.526315789 | 0.38415 | 0.4375 | 3.3511641 |
| 0.7931 | 0.69524 | 0.333333333 | 0.526315789 | 0.39634 | 0.5 | 3.24433213 |
| 0.58621 | 0.42857 | 0.416666667 | 0.263157895 | 0.52439 | 0.25 | 2.46899313 |
| 0.56897 | 0.39048 | 0.25 | 0.473684211 | 0.4878 | 0.4375 | 2.6084308 |
| 0.84483 | 0.72381 | 0.416666667 | 0.473684211 | 0.59146 | 0.5 | 3.5504514 |
| 0.72414 | 0.55238 | 0.333333333 | 0.526315789 | 0.42683 | 0.5 | 3.06299727 |
| 0.56897 | 0.37143 | 0.166666667 | 0.421052632 | 0.37805 | 0.40625 | 2.31241217 |
| 0.72414 | 0.53333 | 0.25 | 0.315789474 | 0.39634 | 0.21875 | 2.4383522 |
| 0.94828 | 0.93333 | 0.5 | 0.526315789 | 0.68293 | 0.34375 | 3.93460181 |
| 0.68966 | 0.66667 | 0.416666667 | 0.315789474 | 0.40854 | 0.46875 | 2.96606456 |
| 0.96552 | 0.82857 | 0.5 | 0.315789474 | 0.15244 | 0.375 | 3.13731717 |
| 0.75862 | 0.57143 | 0.5 | 0.263157895 | 0.17073 | 0.3125 | 2.57643886 |
| 0.60345 | 0.54286 | 0.5 | 0.263157895 | 0.20122 | 0.25 | 2.36068283 |
| 0.60345 | 0.46667 | 0.5 | 0.210526316 | 0.23171 | 0.34375 | 2.35609858 |
| 0.62069 | 0.40952 | 0.5 | 0.263157895 | 0.25 | 0.40625 | 2.44962136 |
| 0.51724 | 0.34286 | 0.5 | 0.263157895 | 0.2378 | 0.40625 | 2.26731129 |
| 0.53448 | 0.48571 | 0.416666667 | 0.263157895 | 0.18902 | 0.375 | 2.264046 |
| 0.51724 | 0.38095 | 0.416666667 | 0.421052632 | 0.13415 | 0.625 | 2.4950594 |
| 0.7931 | 0.51429 | 0.416666667 | 0.789473684 | 0.20122 | 1 | 3.71474903 |
| 0.62069 | 0.44762 | 0.416666667 | 0.368421053 | 0.12195 | 0.34375 | 2.31909764 |
| 0.72414 | 0.65714 | 0.416666667 | 0.421052632 | 0.15244 | 0.59375 | 2.96518911 |
| 0.67241 | 0.6381 | 0.5 | 0.631578947 | 0.12195 | 0.875 | 3.4390392 |
| 0.74138 | 0.66667 | 0.5 | 0.421052632 | 0.17683 | 0.46875 | 2.97467788 |
| 0.77586 | 0.66667 | 0.5 | 0.631578947 | 0.15854 | 0.625 | 3.35764427 |
| 0.74138 | 0.57143 | 0.5 | 0.526315789 | 0.19512 | 0.6875 | 3.22174562 |

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|---------|---------|-------------|-------------|---------|---------|------------|
| 0.60345 | 0.54286 | 0.5 | 0.473684211 | 0.21341 | 0.625 | 2.95840426 |
| 0.87931 | 0.70476 | 0.5 | 0.894736842 | 0.10366 | 0.8125 | 3.89496763 |
| 0.68966 | 0.66667 | 0.666666667 | 0.473684211 | 0.15244 | 0.78125 | 3.43036174 |
| 0.55172 | 0.3619 | 0.583333333 | 0.473684211 | 0.17073 | 0.59375 | 2.73512815 |
| 0.44828 | 0.34286 | 0.583333333 | 0.473684211 | 0.10976 | 0.4375 | 2.39540665 |
| 0.63793 | 0.42857 | 0.5 | 0.578947368 | 0.12195 | 0.65625 | 2.92365105 |
| 0.5 | 0.27619 | 0.25 | 0.684210526 | 0.14634 | 0.8125 | 2.66924247 |
| 0.75862 | 0.45714 | 0.333333333 | 1 | 0.09146 | 0.9375 | 3.57806029 |
| 0.58621 | 0.41905 | 0.25 | 0.894736842 | 0.09146 | 1 | 3.24145477 |
| 0.48276 | 0.34286 | 0.333333333 | 0.315789474 | 0.12805 | 0.25 | 1.85278735 |
| 0.62069 | 0.40952 | 0.5 | 0.157894737 | 0.15854 | 0.125 | 1.97164479 |
| 0.55172 | 0.59048 | 0.5 | 0.315789474 | 0.17073 | 0.3125 | 2.44122151 |
| 0.25862 | 0.31429 | 0.416666667 | 0 | 0.09756 | 0.03125 | 1.11838405 |
| 0.63793 | 0.5619 | 0.416666667 | 0.473684211 | 0.12195 | 0.5625 | 2.77463789 |
| 0.75862 | 0.61905 | 0.5 | 0.631578947 | 0.10976 | 0.59375 | 3.21275335 |
| 0.2069 | 0 | 0.5 | 0.105263158 | 0.06098 | 0.125 | 0.99813532 |
| 0 | 0.09524 | 0.5 | 0 | 0.07927 | 0.1875 | 0.86200639 |
| 0.24138 | 0.13333 | 0.416666667 | 0.052631579 | 0.08537 | 0.15625 | 1.08562674 |
| 0.43103 | 0.21905 | 0.5 | 0.105263158 | 0.17073 | 0.25 | 1.67607697 |
| 0.53448 | 0.37143 | 0.5 | 0.526315789 | 0.13415 | 0.875 | 2.94137346 |
| 0.43103 | 0.22857 | 0.416666667 | 0.368421053 | 0.08537 | 0.4375 | 1.96755948 |
| 0.68966 | 0.42857 | 0.5 | 1 | 0.18293 | 1 | 3.80115343 |
| 0.63793 | 0.46667 | 0.5 | 0.684210526 | 0.15244 | 0.96875 | 3.40999725 |
| 0.55172 | 0.34286 | 0.416666667 | 0.368421053 | 0.17073 | 0.6875 | 2.53790071 |
| 0.5 | 0.4 | 0.5 | 0.210526316 | 0.22561 | 0.375 | 2.21113607 |
| 0.60345 | 0.47619 | 0.5 | 0.526315789 | 0.21341 | 0.71875 | 3.03811918 |
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| 0.68966 | 0.48571 | 0.416666667 | 1 | 0.18293 | 1 | 3.77496295 |
| 0.62069 | 0.45714 | 0.583333333 | 0.421052632 | 0.22561 | 0.71875 | 3.02657823 |
| 0.74138 | 0.51429 | 0.75 | 0.947368421 | 0.16463 | 0.90625 | 4.02391759 |
| 0.86207 | 0.79048 | 0.5 | 0.736842105 | 0.2561 | 1 | 4.14548482 |
| 0.46552 | 0.29524 | 0.416666667 | 0.263157895 | 0.12805 | 0.375 | 1.94362868 |
| 0.53448 | 0.49524 | 0.416666667 | 0.789473684 | 0.13415 | 0.6875 | 3.05750755 |
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| 0.41379 | 0.21905 | 0.666666667 | 0.421052632 | 0.10976 | 0.65625 | 2.48656612 |

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|---------|---------|-------------|-------------|---------|---------|------------|
| 0.58621 | 0.4381 | 0.5 | 0.578947368 | 0.13415 | 0.59375 | 2.83114584 |
| 0.41379 | 0.2381 | 0.416666667 | 0.684210526 | 0.11585 | 0.90625 | 2.77486919 |
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| 0.91379 | 0.80952 | 0.583333333 | 0.263157895 | 0.13415 | 0.25 | 2.95395448 |
| 0.24138 | 0.21905 | 0.5 | 0.473684211 | 0.10976 | 0.4375 | 1.98136724 |
| 0.46552 | 0.32381 | 0.5 | 0.368421053 | 0.09756 | 0.59375 | 2.34905879 |
| 0.44828 | 0.40952 | 0.5 | 0.315789474 | 0.14634 | 0.5 | 2.31993061 |
| | | | | | | |

| (u1)^m | (u2)^m | (u1)^m.X | (u2)^m.X | d1^2 | d2^2 | u1 Baru | u2 Baru | Selisih |
|------------|-------------|------------|------------|-----------|---------|----------|-----------|------------|
| 0.31005271 | 0.196405171 | 16.7428463 | 0.09142999 | 0.3938729 | 1.88139 | 0.826889 | 0.1731111 | 0.36137165 |
| 0.31072358 | 0.195871876 | 12.4289432 | 0.04390232 | 0.5570283 | 1.60729 | 0.742632 | 0.2573685 | 0.51849359 |
| 0.2007635 | 0.304630698 | 15.0572625 | 0.25210816 | 0.6349172 | 2.33834 | 0.786457 | 0.2135429 | 0.04112916 |
| 0.12054973 | 0.426144286 | 7.95628221 | 0.2865453 | 0.2662955 | 1.19245 | 0.81745 | 0.1825504 | 0.14503579 |
| 0.1899785 | 0.318248031 | 10.6387963 | 0.15912402 | 0.565708 | 0.55205 | 0.49389 | 0.5061101 | 0.00611006 |
| 0.14328608 | 0.386223121 | 11.1763144 | 0.33960999 | 0.5849319 | 2.22019 | 0.791477 | 0.2085229 | 0.08783329 |
| 0.16578727 | 0.351447616 | 13.4287686 | 0.32720985 | 0.5989336 | 2.46494 | 0.804517 | 0.1954827 | 0.12651723 |
| 0.1231701 | 0.421258142 | 8.37556672 | 0.29778593 | 0.4337793 | 1.3321 | 0.754355 | 0.2456447 | 0.04745877 |
| 0.23245122 | 0.268187316 | 19.7583536 | 0.26818732 | 0.6851842 | 3.64244 | 0.841672 | 0.158328 | 0.15832802 |
| 0.3129015 | 0.194149519 | 18.4611883 | 0.10711698 | 0.054627 | 1.03676 | 0.949947 | 0.050053 | 0.39822291 |
| 0.31672329 | 0.191159806 | 18.3699507 | 0.10217162 | 0.0575482 | 0.97416 | 0.944221 | 0.0557793 | 0.40973798 |
| 0.28103923 | 0.220776568 | 17.9865104 | 0.14084022 | 0.0431398 | 1.19413 | 0.965133 | 0.0348669 | 0.32720207 |
| 0.24873269 | 0.251270527 | 19.8986155 | 0.22960927 | 0.4288793 | 3.02629 | 0.875873 | 0.1241269 | 0.03791999 |
| 0.22851341 | 0.272451882 | 17.3670193 | 0.23017487 | 0.2046117 | 2.32368 | 0.919071 | 0.0809289 | 0.07424352 |
| 0.13337116 | 0.402970825 | 8.53575446 | 0.2570676 | 0.3259972 | 1.0043 | 0.754944 | 0.2450559 | 0.11701309 |
| 0.10510967 | 0.456697246 | 7.46278634 | 0.34645998 | 0.3628501 | 1.57768 | 0.813015 | 0.1869852 | 0.05439406 |
| 0.10217986 | 0.462868176 | 7.76566905 | 0.3910438 | 0.2525125 | 1.82918 | 0.878699 | 0.1213014 | 0.03387104 |
| 0.1602593 | 0.359611318 | 9.13477989 | 0.18600585 | 0.2643173 | 0.7561 | 0.740973 | 0.2590274 | 0.22373118 |
| 0.14148515 | 0.389194911 | 8.34762392 | 0.21472823 | 0.3670008 | 0.86624 | 0.702411 | 0.2975893 | 0.15068654 |
| 0.12703046 | 0.4142038 | 9.65431515 | 0.3499308 | 0.4371207 | 1.57824 | 0.783105 | 0.216895 | 0.06172259 |
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| 0.22074944 | 0.281069833 | 14.1279643 | 0.17930317 | 0.2204973 | 1.80576 | 0.89118 | 0.1088197 | 0.25324923 |
| 0.16349953 | 0.354798029 | 8.99247411 | 0.17128181 | 0.2759245 | 1.03247 | 0.789112 | 0.2108883 | 0.30635306 |
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| 0.11728459 | 0.432347843 | 8.56177474 | 0.34289656 | 0.2069184 | 1.90758 | 0.902143 | 0.0978572 | 0.10903937 |
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| 0.13777581 | 0.395412534 | 8.26654845 | 0.2249761 | 0.183786 | 1.19243 | 0.866456 | 0.1335444 | 0.29749003 |
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| 0.15733512 | 0.364025291 | 9.75477757 | 0.21967043 | 0.158706 | 1.0481 | 0.868491 | 0.131509 | 0.26504275 |
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| 2 | 0 |

0.606060606

Sheet 3 (iterasi 3)

| U1 | U2 | U1^2 | U2^2 | Jarak D1 | Jarak D2 | F.Objektif |
|--------------|-------------|-------------|--------------|-------------|----------|--------------|
| 0.465517241 | 0.285714286 | 0.916666667 | 0.793473684 | 0.036585366 | 0.34375 | 2.837707244 |
| 0.224137931 | 0.2 | 1 | 0.613578947 | 0 | 0.34375 | 2.399466878 |
| 0.827586207 | 0.819047619 | 0 | 0.842105263 | 0.329268293 | 0.40625 | 3.224257382 |
| 0.672413793 | 0.638095238 | 0.166666667 | 0.368421053 | 0.268293683 | 0.3125 | 2.426389433 |
| 0.5 | 0.333333333 | 0.333333333 | 0.105261538 | 0.262195122 | 0 | 1.534124947 |
| 0.879310345 | 0.79047619 | 0.25 | 0.421052632 | 0.646434146 | 0.375 | 3.380473313 |
| 0.931034483 | 0.895238095 | 0.166666667 | 0.473684211 | 0.54268297 | 0.5 | 3.509306382 |
| 0.706896552 | 0.628571429 | 0.416666667 | 0.157894737 | 0.451219512 | 0.1875 | 2.548748896 |
| 1 | 1 | 0.5 | 0.842105263 | 0.347560976 | 0.75 | 4.439666239 |
| 0.551724138 | 0.39047619 | 0.416666667 | 0.315789474 | 0.237804878 | 0.5 | 2.412461347 |
| 0.534482759 | 0.371428571 | 0.333333333 | 0.368421053 | 0.231707317 | 0.5 | 2.339373033 |
| 0.637931034 | 0.4 | 0.333333333 | 0.421052632 | 0.237804878 | 0.53125 | 2.561371877 |
| 0.913793103 | 0.828571429 | 0.416666667 | 0.842105263 | 0.243902439 | 0.75 | 3.995038901 |
| 0.844827586 | 0.723809524 | 0.666666667 | 0.526315789 | 0.219512195 | 0.5625 | 3.543631761 |
| 0.637931034 | 0.523809524 | 0.416666667 | 0.157894737 | 0.298780488 | 0.1875 | 2.22258245 |
| 0.75862069 | 0.723809524 | 0.416666667 | 0.315789474 | 0.396341463 | 0.21875 | 2.829977817 |
| 0.844827586 | 0.695238095 | 0.333333333 | 0.421052632 | 0.390243902 | 0.4375 | 3.122195549 |
| 0.517241379 | 0.333333333 | 0.333333333 | 0.210526316 | 0.37804878 | 0.28125 | 2.053733142 |
| 0.551724138 | 0.552380952 | 0.333333333 | 0.210526316 | 0.292682927 | 0.125 | 2.065647666 |
| 0.844827586 | 0.704761905 | 0.416666667 | 0.263157895 | 0.317073171 | 0.15625 | 2.702737223 |
| 0.74137931 | 0.59047619 | 0.333333333 | 0.261517895 | 0.298780488 | 0.40625 | 2.633377217 |
| 0.637931034 | 0.438095238 | 0.333333333 | 0.842105263 | 0.408536585 | 0.46875 | 3.128751454 |
| 0.482758621 | 0.333333333 | 0.25 | 0.421052632 | 0.554878049 | 0.375 | 2.417026364 |
| 0.586206957 | 0.348095238 | 0.5 | 0.315789474 | 1 | 0.625 | 3.465091608 |
| 0.637931034 | 0.39047619 | 0.416666667 | 0.421052632 | 0.280487805 | 0.46875 | 2.615364328 |
| 0.706896552 | 0.476190476 | 0.416666667 | 0.263157895 | 0.384146341 | 0.21875 | 2.465807931 |
| 0.534482759 | 0.232809524 | 0.25 | 0.631578947 | 0.359756098 | 0.71875 | 2.818377327 |
| 0.655172414 | 0.485714286 | 0.333333333 | 0.421052632 | 0.487804878 | 0.375 | 2.758077542 |
| 0.810344828 | 0.60952381 | 0.583333333 | 0.526315789 | 0.384146341 | 0.4375 | 3.351164101 |
| 0.793103448 | 0.695238095 | 0.333333333 | 0.526315789 | 0.396341463 | 0.5 | 3.244332123 |
| 0.580206957 | 0.128571429 | 0.416666667 | 0.263157895 | 0.542300244 | 0.25 | 2.40899313 |
| 0.5689655517 | 0.39047619 | 0.25 | 0.473684211 | 0.487804878 | 0.4375 | 2.608430796 |
| 0.844827586 | 0.723809524 | 0.416666667 | 0.473684211 | 0.591463415 | 0.5 | 3.550451402 |
| 0.724137931 | 0.552380952 | 0.333333333 | 0.526315789 | 0.426829268 | 0.5 | 3.062997725 |
| 0.5689655517 | 0.371428571 | 0.166666667 | 0.421052632 | 0.37804878 | 0.40625 | 2.3121412167 |
| 0.724137931 | 0.533333333 | 0.25 | 0.315789474 | 0.396341463 | 0.21875 | 2.383572201 |
| 0.948275862 | 0.933333333 | 0.5 | 0.526315789 | 0.682926829 | 0.34375 | 3.931601814 |
| 0.680655172 | 0.666666667 | 0.416666667 | 0.315789474 | 0.408536585 | 0.46875 | 2.966064565 |
| 0.965517241 | 0.828571429 | 0.5 | 0.315789474 | 0.152439024 | 0.375 | 3.137317168 |
| 0.75862069 | 0.271428571 | 0.5 | 0.263157895 | 0.170731707 | 0.3125 | 2.576138863 |
| 0.60348276 | 0.521285714 | 0.5 | 0.263157895 | 0.201219512 | 0.25 | 2.360082826 |
| 0.603448276 | 0.466666667 | 0.5 | 0.210526316 | 0.231707317 | 0.34375 | 2.356098575 |
| 0.620696555 | 0.10952381 | 0.5 | 0.263157895 | 0.263157895 | 0.10625 | 2.19621359 |
| 0.517241379 | 0.312857143 | 0.5 | 0.263157895 | 0.237804878 | 0.40625 | 2.267311295 |
| 0.534482759 | 0.485714286 | 0.416666667 | 0.263157895 | 0.189024390 | 0.375 | 2.264045996 |
| 0.517241379 | 0.380952381 | 0.416666667 | 0.421052632 | 0.134146341 | 0.625 | 2.4950591 |
| 0.793103448 | 0.128571429 | 0.416666667 | 0.7893473684 | 0.201219512 | 1 | 3.71479026 |
| 0.620696555 | 0.147619048 | 0.416666667 | 0.368421053 | 0.12195122 | 0.34375 | 2.310097642 |
| 0.724137931 | 0.657142857 | 0.416666667 | 0.421052632 | 0.152439024 | 0.59375 | 2.965189111 |
| 0.672413793 | 0.638095238 | 0.5 | 0.631578947 | 0.12195122 | 0.875 | 3.130039108 |
| 0.74137931 | 0.666666667 | 0.5 | 0.421052632 | 0.176829268 | 0.46875 | 2.974677877 |
| 0.775862069 | 0.666666667 | 0.5 | 0.631578947 | 0.158536585 | 0.625 | 3.357641268 |
| 0.71137931 | 0.571428571 | 0.5 | 0.526315789 | 0.195321951 | 0.6875 | 3.221715622 |
| 0.60348276 | 0.528571429 | 0.5 | 0.473684211 | 0.213414634 | 0.625 | 2.958401263 |
| 0.879310345 | 0.704761905 | 0.5 | 0.804736842 | 0.103658537 | 0.8125 | 3.804967628 |
| 0.680655172 | 0.666666667 | 0.066666667 | 0.473684211 | 0.152439024 | 0.78125 | 3.430361741 |
| 0.551724138 | 0.361904762 | 0.583333333 | 0.473684211 | 0.170731707 | 0.59375 | 2.735128151 |
| 0.448275862 | 0.342857143 | 0.583333333 | 0.473684211 | 0.109756098 | 0.4375 | 2.395406646 |
| 0.637931034 | 0.428571429 | 0.5 | 0.578947368 | 0.12195122 | 0.65625 | 2.923651051 |
| 0.5 | 0.376190476 | 0.25 | 0.684210526 | 0.146341463 | 0.8125 | 2.609241266 |
| 0.75862069 | 0.457142857 | 0.333333333 | 1 | 0.091463415 | 0.9375 | 3.578060295 |
| 0.580206957 | 0.119047619 | 0.25 | 0.894736842 | 0.091463415 | 1 | 3.2411454772 |
| 0.482758621 | 0.342857143 | 0.333333333 | 0.315789474 | 0.12804878 | 0.25 | 1.852787351 |
| 0.620696555 | 0.14952381 | 0.5 | 0.157894737 | 0.158536585 | 0.125 | 1.971644787 |
| 0.551724138 | 0.59047619 | 0.5 | 0.315789474 | 0.170731707 | 0.3125 | 2.441221509 |
| 0.25862069 | 0.314285714 | 0.416666667 | 0 | 0.097560976 | 0.03125 | 1.118384046 |
| 0.637931034 | 0.561904762 | 0.416666667 | 0.473684211 | 0.12195122 | 0.5625 | 2.774637893 |
| 0.75862069 | 0.69047619 | 0.5 | 0.631578947 | 0.109756098 | 0.59375 | 3.212753354 |
| 0.206896552 | 0 | 0.5 | 0.1026263158 | 0.069975631 | 0.125 | 0.998135159 |
| 0 | 0.095238095 | 0.5 | 0 | 0.079268293 | 0.1875 | 0.862006388 |
| 0.24137931 | 0.133333333 | 0.416666667 | 0.052631579 | 0.085365854 | 0.15625 | 1.085626743 |
| 0.431034483 | 0.219047619 | 0.5 | 0.105263158 | 0.170731707 | 0.25 | 1.676076967 |
| 0.534482759 | 0.371428571 | 0.5 | 0.526315789 | 0.134146341 | 0.875 | 2.941373961 |
| 0.431034483 | 0.28571429 | 0.416666667 | 0.368421053 | 0.085365854 | 0.4375 | 1.967559484 |
| 0.689655172 | 0.28571429 | 0.5 | 1 | 0.182926829 | 1 | 3.80115343 |
| 0.637931034 | 0.466666667 | 0.5 | 0.684210526 | 0.152439024 | 0.96875 | 3.409997252 |
| 0.551724138 | 0.342857143 | 0.416666667 | 0.368421053 | 0.170731707 | 0.6875 | 2.537900707 |
| 0.5 | 0.4 | 0.5 | 0.210526316 | 0.225609756 | 0.375 | 2.211136072 |
| 0.603448276 | 0.333333333 | 0.5 | 0.526315789 | 0.213414634 | 0.71875 | 3.038119176 |
| 0.482758621 | 0.28571429 | 0.5 | 0.210526316 | 0.25 | 0.4375 | 2.21411827 |
| 0.689655172 | 0.485714286 | 0.416666667 | 0 | 0.182926829 | 1 | 3.774962954 |
| 0.620696555 | 0.457142857 | 0.583333333 | 0.421052632 | 0.225609756 | 0.71875 | 3.026578233 |
| 0.74137931 | 0.514285714 | 0.75 | 0.947368421 | 0.164643446 | 0.90625 | 4.023917592 |
| 0.862068966 | 0.79047619 | 0.5 | 0.736842105 | 0.256097561 | 1 | 4.145484822 |
| 0.465517241 | 0.295238095 | 0.416666667 | 0.263157895 | 0.12804878 | 0.375 | 1.943628679 |
| 0.534482759 | 0.095238095 | 0.416666667 | 0.7893473684 | 0.134146341 | 0.6875 | 3.057507546 |
| 0.137931034 | 0.371428571 | 0.416666667 | 0.421052632 | 0.067073171 | 0.375 | 1.589152075 |
| 0.413793103 | 0.219047619 | 0.666666667 | 0.421052632 | 0.109756098 | 0.65625 | 2.486566118 |
| 0.586206957 | 0.348095238 | 0.5 | 0.578947368 | 0.134146341 | 0.59375 | 2.83115845 |
| 0.413793103 | 0.238095238 | 0.416666667 | 0.684210526 | 0.158536569 | 0.90625 | 2.774869193 |
| 0.689655172 | 0.523809524 | 0.5 | 0.315789474 | 0.140243902 | 0.625 | 2.794498072 |
| 0.5 | 0.314285714 | 0.5 | 0.473684211 | 0.12804878 | 0.6875 | 2.60351805 |
| 0.465517241 | 0.342857143 | 0.416666667 | 0.157894737 | 0.158536585 | 0.1875 | 1.728972373 |
| 0.913793103 | 0.80952381 | 0.583333333 | 0.26157895 | 0.134146341 | 0.25 | 2.953944843 |
| 0.24137931 | 0.219047619 | 0.5 | 0.473684211 | 0.109756098 | 0.4375 | 1.981367237 |
| 0.465517241 | 0.323809524 | 0.5 | 0.368421053 | 0.097560976 | 0.59375 | 2.349058793 |
| 0.448275862 | 0.40952381 | 0.5 | 0.315789474 | 0.146341463 | 0.5 | 2.319930609 |

| $(u1)^m$ | $(u2)^m$ | $(u1)^m \times X$ | $(u2)^m \times X$ | $d1^{\wedge}2$ | $d2^{\wedge}2$ | $u1 \text{ Baru}$ | $u2 \text{ Baru}$ | Selisih | Label | Cak kecokolan |
|-------------|--------------|-------------------|-------------------|----------------|----------------|-------------------|-------------------|-------------|-------|---------------|
| -0.68374524 | 0.029967455 | 36.9222431 | 1.61834257 | 2161.3391 | 1306.98 | 0.376835 | 0.6231655 | 0.45005439 | 2 | 0 |
| -0.55150158 | 0.066238532 | 22.0606633 | 2.64954126 | 3447.4791 | 2471.1 | 0.471516 | 0.5824893 | 0.32511541 | 2 | 0 |
| 0.61851469 | 0.045600591 | 46.3886019 | 3.42004434 | 1732.5191 | 1996.2 | 0.535359 | 0.6464614 | 0.25109848 | 1 | 0 |
| -0.6682382 | 0.033324655 | 44.1027722 | 2.19942721 | 416.1791 | 474.184 | 0.532574 | 0.4674264 | 0.28487601 | 1 | 1 |
| 0.24392727 | 0.256147394 | 13.6599272 | 14.3444254 | 522.0991 | 646.384 | 0.553182 | 0.446818 | 0.0595291 | 1 | 0 |
| 0.62643593 | 0.03481818 | 48.8620027 | 3.39158179 | 5425.1791 | 7123.66 | 0.567675 | 0.4323251 | 0.22386211 | 1 | 0 |
| 0.64724801 | 0.038213505 | 52.4270888 | 3.09529387 | 402.4591 | 5448.04 | 0.558745 | 0.4112551 | 0.24557723 | 1 | 0 |
| 0.56905195 | 0.0604141307 | 38.6955329 | 4.10320888 | 1262.5591 | 2098.47 | 0.624348 | 0.3756518 | 0.13000709 | 1 | 0 |
| 0.70841172 | 0.025067763 | 60.214996 | 2.13075284 | 4037.5591 | 4299.32 | 0.515653 | 0.6482465 | 0.32601851 | 1 | 0 |
| 0.80239939 | 0.0205298 | 53.2415638 | 0.1478116 | 137.4791 | 128.884 | 0.483865 | 0.5161348 | 0.46608181 | 2 | 0 |
| 0.8915528 | 0.00311126 | 51.7100623 | 18.0405692 | 180.5931 | 155.144 | 0.461623 | 0.5383766 | 0.48359129 | 2 | 0 |
| 0.93148151 | 0.001215701 | 59.334642 | 0.07764843 | 130.6191 | 116.744 | 0.471953 | 0.5280467 | 0.49317976 | 2 | 1 |
| 0.76715372 | 0.015407483 | 61.3722975 | 1.23259863 | 2037.4591 | 1909.26 | 0.483759 | 0.5162407 | 0.39211386 | 2 | 1 |
| 0.84469711 | 0.006494985 | 64.1965971 | 0.49776087 | 1158.1191 | 952.824 | 0.451374 | 0.5486265 | 0.46769758 | 1 | 1 |
| 0.56994064 | 0.060052381 | 36.4762007 | 3.84353237 | 206.6191 | 422.144 | 0.671384 | 0.3286122 | 0.08355628 | 1 | 0 |
| 0.66099299 | 0.034963482 | 46.9305023 | 2.48240724 | 1304.5993 | 1875.32 | 0.589739 | 0.4102612 | 0.223276 | 1 | 0 |
| 0.77211127 | 0.014714023 | 58.6804569 | 1.11286578 | 1167.5391 | 1715.06 | 0.594971 | 0.4050295 | 0.2837281 | 1 | 0 |
| 0.54904033 | 0.067095217 | 31.295286 | 3.82442739 | 514.5391 | 1130.32 | 0.687184 | 0.3128158 | 0.05788837 | 1 | 1 |
| 0.49338077 | 0.088559403 | 29.1094652 | 5.22500475 | 255.3791 | 445.204 | 0.635476 | 0.3645238 | 0.066693448 | 1 | 0 |
| 0.61325344 | 0.047034442 | 46.6072611 | 3.57530162 | 1075.8993 | 1308.46 | 0.548769 | 0.4512313 | 0.23433629 | 1 | 0 |
| 0.76672322 | 0.015532699 | 53.6390541 | 1.08728892 | 318.0991 | 509.384 | 0.615582 | 0.3841178 | 0.25978753 | 1 | 1 |
| 0.79420227 | 0.011841734 | 50.8289453 | 0.757877098 | 495.0991 | 1201.86 | 0.707994 | 0.2920063 | 0.18318661 | 1 | 0 |
| 0.6269724 | 0.044473883 | 34.2483484 | 2.44606358 | 2205.6791 | 3581.84 | 0.618891 | 0.3811094 | 0.17022104 | 1 | 0 |
| 0.70203575 | 0.057936732 | 35.1686007 | 3.53414022 | 13850.17 | 17078.1 | 0.552315 | 0.4767852 | 0.20698479 | 1 | 1 |
| 0.92617751 | 0.004411711 | 59.2617664 | 0.09032133 | 32.2591 | 261.784 | 0.759204 | 0.2607962 | 0.22322933 | 1 | 0 |
| 0.65281081 | 0.036867661 | 44.3911349 | 2.50761361 | 447.391 | 1037.23 | 0.695879 | 0.3012133 | 0.10398836 | 1 | 1 |
| 0.84602039 | 0.006133056 | 49.0691825 | 0.37311725 | 438.6991 | 973.784 | 0.689413 | 0.3105272 | 0.23038088 | 1 | 1 |
| 0.76354763 | 0.015939269 | 49.6234461 | 1.03605249 | 1173.3991 | 2207.8 | 0.652964 | 0.3470396 | 0.22878518 | 1 | 0 |
| 0.84246785 | 0.006746901 | 62.3426211 | 0.49927071 | 736.4791 | 1274.22 | 0.633721 | 0.3662794 | 0.28413993 | 1 | 0 |
| 0.81386167 | 0.009576028 | 59.4119017 | 0.69905003 | 1109.1191 | 1684.48 | 0.602979 | 0.397021 | 0.29161686 | 1 | 0 |
| 0.609005602 | 0.048215192 | 37.1524173 | 2.94112688 | 1660.7192 | 2870.6 | 0.635102 | 0.3664976 | 0.14691802 | 1 | 1 |
| 0.75074522 | 0.017893142 | 45.0447132 | 1.0700472 | 1185.5391 | 2252.9 | 0.6521 | 0.3447895 | 0.21124509 | 1 | 0 |
| 0.7433762 | 0.018899086 | 56.4965912 | 1.44330538 | 3562.4791 | 4960.22 | 0.582001 | 0.4175987 | 0.28019142 | 1 | 0 |
| 0.85049549 | 0.006049213 | 58.6841887 | 0.41739774 | 727.3791 | 1476.84 | 0.608987 | 0.3301029 | 0.25232599 | 1 | 1 |
| 0.70013443 | 0.02650371 | 42.008058 | 1.5992226 | 346.1191 | 952.064 | 0.733832 | 0.2666182 | 0.103535851 | 1 | 1 |
| 0.61546793 | 0.046132647 | 42.4072871 | 2.3085264 | 570.3991 | 1201.28 | 0.678047 | 0.3219533 | 0.10647093 | 1 | 0 |
| 0.6354964 | 0.041135839 | 52.1107047 | 3.37313878 | 724.6993 | 8067.62 | 0.533209 | 0.4467955 | 0.24397577 | 1 | 0 |
| 0.80160563 | 0.010956099 | 53.707577 | 0.73411809 | 940.4791 | 1579.06 | 0.626686 | 0.3731401 | 0.26801474 | 1 | 0 |
| 0.70529243 | 0.025658624 | 58.5939219 | 2.12966581 | 2509.6791 | 1990.44 | 0.442309 | 0.5570912 | 0.39750815 | 2 | 1 |
| 0.79002168 | 0.016584674 | 53.8005392 | 1.17751186 | 605.8591 | 308.204 | 0.316111 | 0.6835895 | 0.0548408 | 2 | 0 |
| 0.73881368 | 0.016570524 | 51.2609836 | 0.930750524 | 948.7911 | 138.781 | 0.287160 | 0.512533 | 0.56012358 | 2 | 0 |
| 0.77051222 | 0.007046623 | 52.7613129 | 0.7613129 | 147.6191 | 89.04 | 0.561487 | 0.6292136 | 0.49770464 | 1 | 1 |
| 0.83310522 | 0.007046623 | 52.7613129 | 0.7613129 | 147.6191 | 89.04 | 0.561487 | 0.6292136 | 0.49770464 | 1 | 0 |
| 0.70903584 | 0.011125917 | 54.1540423 | 0.24881329 | 268.8391 | 273.681 | 0.5041425 | 0.6252354 | 0.49213106 | 2 | 0 |
| 0.78993632 | 0.012360279 | 53.8162986 | 0.71740529 | 288.5391 | 47.3837 | 0.114098 | 0.8589111 | 0.71769471 | 2 | 0 |
| 0.72728211 | 0.000187768 | 55.4485803 | 0.01073272 | 711.1791 | 264.164 | 0.270911 | 0.7299886 | 0.71628578 | 2 | 0 |
| 0.81042802 | 0.00995200 | 59.1688802 | 0.72657335 | 625.7591 | 474.884 | 0.402573 | 0.5941277 | 0.49151196 | 2 | 0 |
| 0.83707274 | 0.007230152 | 52.7353520 | 0.45606624 | 725.7393 | 239.004 | 0.235607 | 0.7643432 | 0.67292626 | 2 | 1 |
| 0.90348848 | 0.002448259 | 62.3407054 | 0.16892989 | 979.2591 | 520.484 | 0.347049 | 0.6529514 | 0.60347147 | 2 | 1 |
| 0.88228319 | 0.036681574 | 58.2306095 | 0.24318189 | 1246.2991 | 657.904 | 0.345501 | 0.6544991 | 0.59379845 | 2 | 1 |
| 0.87761985 | 0.003992512 | 61.4333896 | 0.27947587 | 880.8591 | 521.584 | 0.371911 | 0.6280891 | 0.56190281 | 2 | 1 |
| 0.89589339 | 0.002860491 | 64.5043243 | 0.20595288 | 1064.0391 | 621.784 | 0.368831 | 0.6311609 | 0.57768546 | 2 | 1 |
| 0.94098359 | 0.000897147 | 65.8068516 | 0.06281916 | 499.0391 | 241.264 | 0.325899 | 0.67141013 | 0.64114442 | 2 | 0 |
| 0.97777937 | 0.00012483 | 60.6223211 | 0.00773945 | 237.3391 | 74.6237 | 0.239054 | 0.7609462 | 0.3977348 | 2 | 1 |
| 0.78791447 | 0.012623542 | 61.4573287 | 0.984763025 | 2024.6791 | 1327.82 | 0.396069 | 0.6039906 | 0.49157609 | 2 | 1 |
| 0.88623821 | 0.003433695 | 59.3779604 | 0.23005758 | 1089.5791 | 614.364 | 0.361509 | 0.6384911 | 0.5789336 | 2 | 0 |
| 0.97211481 | 0.000131291 | 57.6556737 | 0.007746169 | 495.1191 | 199.481 | 0.287191 | 0.712809 | 0.70133572 | 2 | 0 |
| 0.80896405 | 0.00120134 | 47.1643845 | 0.1701371 | 1047.8791 | 504.044 | 0.321766 | 0.5752343 | 0.6187763 | 2 | 0 |
| 0.79797023 | 0.000104057 | 62.7009521 | 0.006663964 | 783.9121 | 257.941 | 0.247579 | 0.7524207 | 0.71221983 | 2 | 0 |
| 0.82526064 | 0.00865862 | 46.163396 | 0.48482149 | 1033.9391 | 686.504 | 0.396732 | 0.51247807 | 0.582035032 | 2 | 0 |
| 0.75191204 | 0.017654737 | 53.3857859 | 1.25348634 | 1427.6191 | 757.281 | 0.346598 | 0.6534017 | 0.52053052 | 2 | 0 |
| 0.79066885 | 0.018093757 | 45.6932001 | 1.103708008 | 134.0191 | 696.324 | 0.341278 | 0.587222 | 0.52420984 | 2 | 0 |
| 0.58306644 | 0.058906331 | 32.0686653 | 0.709860604 | 912.3791 | 456.524 | 0.333494 | 0.6660339 | 0.43009194 | 2 | 0 |
| 0.50685145 | 0.082981412 | 31.9316141 | 5.22783082 | 660.8791 | 305.884 | 0.3164 | 0.8840001 | 0.395350506 | 2 | 1 |
| 0.78274321 | 0.013287689 | 46.1818496 | 0.78397364 | 574.5393 | 222.964 | 0.279577 | 0.7204227 | 0.60515044 | 2 | 0 |
| 0.11161606 | 0.014344715 | 48.6786504 | 18.6247805 | 1802.5991 | 1237.42 | 0.407044 | 0.5929558 | 0.0729262 | 2 | 1 |
| 0.57578333 | 0.000046096 | 61.2722132 | 0.027902113 | 839.8991 | 281.704 | 0.251162 | 0.7488383 | 0.72729598 | 2 | 1 |
| 0.9999731 | 0.002126079 | 64.603919 | 0.15095134 | 1238.8991 | 602.124 | 0.327059 | 0.6729407 | 0.62683128 | 2 | 0 |
| 0.09570507 | 0.0224984781 | 3.80277302 | 18.4464065 | 4349.0991 | 3712.08 | 0.464089 | 0.5395113 | 0.1482276 | 2 | 0 |
| 0.06641626 | 0.05098218 | 1.79323898 | 14.8676089 | 3887.3391 | 3313.64 | 0.46165 | 0.538345 | 0.20425196 | 2 | 0 |
| 0.10193928 | 0.06338644 | 4.17951065 | 18.9986064 | 2809.6391 | 2240.64 | 0.43732 | 0.5626803 | 0.12444037 | 2 | 0 |
| 0.39724744 | 0.013669667 | 20.6568671 | 7.10819564 | 1196.7391 | 955.624 | 0.439843 | 0.5560118 | 0.18628748 | 2 | 0 |
| 0.91510281 | 0.001882687 | 53.079631 | 7.1091583 | 869.8991 | 111.184 | 0.231971 | 0.7680289 | 0.63469001 | 2 | 0 |
| 0.7506724 | 0.017485346 | 39.036467 | 0.97295795 | 174.3991 | 139.62 | 0.394667 | 0.605332 | 0.47494668 | 2 | 0 |
| 0.74649337 | 0.015729181 | 51.247853 | 1.05389114 | 716.4391 | 43.004 | 0.382081 | 0.617976 | 0.49429485 | 2 | 0 |
| 0.86552515 | 0.004866931 | 55.3825377 | 0.311423496 | 743.5991 | 333.904 | | | | | |

Sheet 4 (iterasi 4)

| U1 | U2 | U1*2 | U2*2 | Jarak_D1 | Jarak_D2 | F_Objektif |
|-------------|--------------|-------------|-------------|--------------|-------------|--------------|
| 0.465517211 | 0.28571426 | 0.916666667 | 0.789473881 | 0.036585266 | 0.231379 | 2.837707241 |
| 0.24137931 | 0.2 | 1 | 0.615157847 | 0 | 0.34375 | 2.399466878 |
| 0.827586207 | 0.819047619 | 0 | 0.42105265 | 0.329268293 | 0.06261 | 3.224257382 |
| 0.872413793 | 0.63805238 | 0.166666667 | 0.586821053 | 0.268292183 | 0.3126 | 2.026389133 |
| 0.5 | 0.333333333 | 0.333333333 | 0.105261558 | 0.262195122 | 0 | 1.534124947 |
| 0.879310345 | 0.79047619 | 0.25 | 0.421092632 | 0.6646634166 | 0.375 | 3.380373313 |
| 0.831034483 | 0.89523805 | 0.166666667 | 0.473682111 | 0.512682827 | 0.5 | 3.509306383 |
| 0.46896052 | 0.628571429 | 0.416666667 | 0.15189147 | 0.4517719517 | 0.1875 | 2.548484896 |
| 1 | 0.5 | 0.5 | 0.81215263 | 0.317580976 | 0.75 | 4.936662329 |
| 0.551724138 | 0.39047619 | 0.416666667 | 0.31578947 | 0.22784878 | 0.5 | 2.412461347 |
| 0.534463759 | 0.371428571 | 0.333333333 | 0.384821053 | 0.217170717 | 0.5 | 2.389374053 |
| 0.616791014 | 0.4 | 0.333333333 | 0.278847619 | 0.410176102 | 0.781784878 | 0.5875273613 |
| 0.813793103 | 0.828571429 | 0.166666667 | 0.81215263 | 0.213902439 | 0.75 | 3.999303891 |
| 0.844807586 | 0.723889528 | 0.666666667 | 0.576315789 | 0.219521195 | 0.5626 | 3.543611761 |
| 0.184913104 | 0.738895274 | 0.416666667 | 0.11189147 | 0.298700408 | 0.1875 | 2.277262424 |
| 0.75862089 | 0.723808524 | 0.166666667 | 0.31578947 | 0.396211463 | 0.21875 | 2.829977817 |
| 0.844807586 | 0.09523805 | 0.333333333 | 0.421092632 | 0.390248902 | 0.4375 | 3.127195549 |
| 0.151724139 | 0.545855858 | 0.333333333 | 0.710526156 | 0.378847618 | 0.28175 | 2.058473147 |
| 0.551724128 | 0.5523280952 | 0.333333333 | 0.210526316 | 0.292682827 | 0.125 | 2.085617666 |
| 0.844807586 | 0.704719105 | 0.416666667 | 0.263157895 | 0.377031711 | 0.156025 | 2.707372223 |
| 0.741179101 | 0.59047619 | 0.333333333 | 0.263157895 | 0.298700408 | 0.40625 | 2.633377211 |
| 0.837931034 | 0.53805238 | 0.333333333 | 0.81215263 | 0.08536585 | 0.68675 | 3.12875151 |
| 0.460758671 | 0.848833333 | 0.75 | 0.421052632 | 0.554878049 | 0.375 | 3.417027614 |
| 0.586208687 | 0.43805238 | 0.5 | 0.315789474 | 1 | 0.625 | 3.465091608 |
| 0.537911034 | 0.39047619 | 0.416666667 | 0.21052632 | 0.280478705 | 0.68675 | 2.615367228 |
| 0.706895652 | 0.47619047 | 0.416666667 | 0.263157895 | 0.384136341 | 0.21875 | 2.465807931 |
| 0.534463759 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.17875 | 2.818837474 |
| 0.655172414 | 0.485714286 | 0.533333333 | 0.421092632 | 0.485784878 | 0.375 | 2.758071542 |
| 0.810314828 | 0.60952381 | 0.533333333 | 0.524151578 | 0.394149521 | 0.375 | 3.351145101 |
| 0.741379148 | 0.09593805 | 0.333333333 | 0.576315789 | 0.896341463 | 0.5 | 3.24433213 |
| 0.586208687 | 0.43805238 | 0.5 | 0.315789474 | 1 | 0.625 | 3.465091608 |
| 0.537911034 | 0.39047619 | 0.416666667 | 0.21052632 | 0.280478705 | 0.68675 | 2.615367228 |
| 0.706895652 | 0.47619047 | 0.416666667 | 0.263157895 | 0.384136341 | 0.21875 | 2.465807931 |
| 0.534463759 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.17875 | 2.818837474 |
| 0.655172414 | 0.485714286 | 0.533333333 | 0.421092632 | 0.485784878 | 0.375 | 2.758071542 |
| 0.724117911 | 0.5523280952 | 0.333333333 | 0.526315789 | 0.428829268 | 0.5 | 3.062997275 |
| 0.588985517 | 0.371428571 | 0.166666667 | 0.21052632 | 0.378847618 | 0.0625 | 2.312412167 |
| 0.724137931 | 0.533333333 | 0.25 | 0.315789474 | 0.378976029 | 0.21875 | 2.438352021 |
| 0.948273862 | 0.553333333 | 0.5 | 0.526315789 | 0.682929622 | 0.34375 | 3.934661814 |
| 0.886551172 | 0.666666667 | 0.416666667 | 0.31578947 | 0.08536585 | 0.68675 | 2.966051565 |
| 0.905517741 | 0.309571429 | 0.5 | 0.315789474 | 0.151494954 | 0.375 | 3.509041404 |
| 0.724117911 | 0.5523280952 | 0.333333333 | 0.526315789 | 0.428829268 | 0.5 | 3.062997275 |
| 0.588985517 | 0.371428571 | 0.166666667 | 0.21052632 | 0.378847618 | 0.0625 | 2.312412167 |
| 0.724137931 | 0.533333333 | 0.25 | 0.315789474 | 0.378976029 | 0.21875 | 2.438352021 |
| 0.948273862 | 0.553333333 | 0.5 | 0.526315789 | 0.682929622 | 0.34375 | 3.934661814 |
| 0.886551172 | 0.666666667 | 0.416666667 | 0.31578947 | 0.08536585 | 0.68675 | 2.966051565 |
| 0.905517741 | 0.309571429 | 0.5 | 0.315789474 | 0.151494954 | 0.375 | 3.509041404 |
| 0.75862089 | 0.571528571 | 0.5 | 0.231157895 | 0.170721207 | 0.3125 | 2.576438861 |
| 0.60318276 | 0.5212857143 | 0.5 | 0.231157895 | 0.21219512 | 0.25 | 2.360682828 |
| 0.630484876 | 0.466666667 | 0.5 | 0.210526313 | 0.231707317 | 0.34375 | 2.356098575 |
| 0.617069690 | 0.4097381 | 0.5 | 0.710417895 | 0.275520528 | 0.325 | 2.249586975 |
| 0.517241379 | 0.34285718 | 0.5 | 0.263157895 | 0.23784878 | 0.40625 | 2.267311295 |
| 0.534463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.521795741 | 0.382695231 | 0.166666667 | 0.21052632 | 0.193649521 | 0.625 | 2.395059151 |
| 0.534463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.521795741 | 0.382695231 | 0.166666667 | 0.21052632 | 0.193649521 | 0.625 | 2.395059151 |
| 0.534463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.521795741 | 0.382695231 | 0.166666667 | 0.21052632 | 0.193649521 | 0.625 | 2.395059151 |
| 0.721213791 | 0.552128571 | 0.166666667 | 0.21052632 | 0.182490241 | 0.59375 | 2.985189111 |
| 0.667413793 | 0.638095238 | 0.5 | 0.615157897 | 0.121951522 | 0.375 | 3.449039919 |
| 0.741379311 | 0.666666667 | 0.5 | 0.421052632 | 0.176829268 | 0.46875 | 2.974677877 |
| 0.75862089 | 0.666666667 | 0.5 | 0.615157897 | 0.158536585 | 0.625 | 3.357641268 |
| 0.411379111 | 0.317428571 | 0.5 | 0.263157895 | 0.170721071 | 0.6875 | 3.271426207 |
| 0.604948276 | 0.542857143 | 0.25 | 0.473684211 | 0.231414824 | 0.625 | 2.958404263 |
| 0.879310345 | 0.704741428 | 0.5 | 0.894736842 | 0.1306365837 | 0.8125 | 3.894967628 |
| 0.689605172 | 0.646666667 | 0.666666667 | 0.473684211 | 0.1740365837 | 0.8125 | 3.894967628 |
| 0.551724132 | 0.361904761 | 0.533333333 | 0.473684211 | 0.170721071 | 0.723365721 | 1 |
| 0.482738628 | 0.428571429 | 0.333333333 | 0.873684211 | 0.21784878 | 0.25 | 2.256958618 |
| 0.637911034 | 0.428571429 | 0.333333333 | 0.215251512 | 0.65625 | 0.529361055 | 1 |
| 0.76862089 | 0.4285714287 | 0.333333333 | 0.537984768 | 0.194634515 | 0.975 | 2.6001434646 |
| 0.586208687 | 0.419071619 | 0.25 | 0.89736842 | 0.091463451 | 1 | 3.241457771 |
| 0.628728621 | 0.321857143 | 0.333333333 | 0.128476878 | 0.21875 | 2.185277351 | 1 |
| 0.620698605 | 0.40952381 | 0.5 | 0.157884737 | 0.158536585 | 0.125 | 1.971644787 |
| 0.501724138 | 0.50847619 | 0.5 | 0.315789474 | 0.170721071 | 0.3125 | 2.441225099 |
| 0.25862089 | 0.314285714 | 0.166666667 | 0.473684211 | 0.087346976 | 0.02125 | 1.118381046 |
| 0.637911034 | 0.561904762 | 0.416666667 | 0.473684211 | 0.121951522 | 0.5625 | 2.774637893 |
| 0.75862089 | 0.613047619 | 0.5 | 0.615157897 | 0.170721071 | 0.5625 | 3.807537534 |
| 0.268985512 | 0.09523805 | 0.5 | 0.105261558 | 0.250572629 | 0.1875 | 0.862002308 |
| 0.24137931 | 0.133333333 | 0.416666667 | 0.072520528 | 0.072520528 | 0.1525 | 0.862002308 |
| 0.544463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.431044835 | 0.279847619 | 0.5 | 0.101951638 | 0.101951638 | 0.275 | 1.64606969 |
| 0.534463275 | 0.371428571 | 0.5 | 0.263157895 | 0.134364631 | 0.875 | 2.941373461 |
| 0.310344835 | 0.228571429 | 0.166666667 | 0.38891053 | 0.085365854 | 0.375 | 1.967559181 |
| 0.586655172 | 0.428571429 | 0.166666667 | 0.182490241 | 0.182490241 | 1 | 1.80115341 |
| 0.637911034 | 0.466666667 | 0.5 | 0.684210526 | 0.132490241 | 0.98675 | 3.809977579 |
| 0.501724138 | 0.50847619 | 0.5 | 0.315789474 | 0.170721071 | 0.3125 | 2.441225099 |
| 0.25862089 | 0.314285714 | 0.166666667 | 0.473684211 | 0.087346976 | 0.02125 | 1.118381046 |
| 0.637911034 | 0.561904762 | 0.416666667 | 0.473684211 | 0.121951522 | 0.5625 | 2.774637893 |
| 0.75862089 | 0.613047619 | 0.5 | 0.615157897 | 0.170721071 | 0.5625 | 3.807537534 |
| 0.268985512 | 0.09523805 | 0.5 | 0.105261558 | 0.250572629 | 0.1875 | 0.862002308 |
| 0.24137931 | 0.133333333 | 0.416666667 | 0.072520528 | 0.072520528 | 0.275 | 1.64606969 |
| 0.544463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.431044835 | 0.279847619 | 0.5 | 0.101951638 | 0.101951638 | 0.275 | 1.64606969 |
| 0.534463275 | 0.371428571 | 0.5 | 0.263157895 | 0.134364631 | 0.875 | 2.941373461 |
| 0.310344835 | 0.228571429 | 0.166666667 | 0.38891053 | 0.085365854 | 0.375 | 1.967559181 |
| 0.586655172 | 0.428571429 | 0.166666667 | 0.182490241 | 0.182490241 | 1 | 1.80115341 |
| 0.637911034 | 0.561904762 | 0.416666667 | 0.473684211 | 0.121951522 | 0.5625 | 2.774637893 |
| 0.75862089 | 0.613047619 | 0.5 | 0.615157897 | 0.170721071 | 0.5625 | 3.807537534 |
| 0.268985512 | 0.09523805 | 0.5 | 0.105261558 | 0.250572629 | 0.1875 | 0.862002308 |
| 0.24137931 | 0.133333333 | 0.416666667 | 0.072520528 | 0.072520528 | 0.275 | 1.64606969 |
| 0.544463275 | 0.328805274 | 0.25 | 0.615157895 | 0.378976029 | 0.375 | 2.818837474 |
| 0.431044835 | 0.279847619 | 0.5 | 0.101951638 | 0.101951638 | 0.275 | 1.64606969 |
| 0.534463275 | 0.371428571 | 0.5 | 0.263157895 | 0.134364631 | 0.875 | 2.941373461 |
| 0.310344835 | 0.228571429 | 0.166666667 | 0.38891053 | 0.085365854 | 0.375 | 1.967559181 |
| 0.586655172 | 0.428571429 | 0.166666667 | 0. | | | |

| (u)Pm | (u2)Pm | (u3)Pm,X | (u4)Pm,X | d1#2 | d2#2 | u1.Beru | u2.Beru | Selanj |
|--------------|--------------|---------------|--------------|------------|--------------|--------------|--------------|--------------|
| 0.142004243 | 0.389355234 | 7.69822912 | 32.570310275 | 1227.4059 | 6572.4207 | 0.778753261 | 0.211522736 | 0.4116176 |
| 0.17119707 | 0.339287176 | 6.972786269 | 13.57119903 | 3015.1259 | 8275.5107 | 0.731112817 | 0.268857383 | 0.193685931 |
| 0.286660879 | 0.21589166 | 21.49565975 | 16.1918745 | 1710.6359 | 825.3307 | 0.325451429 | 0.674548571 | 0.209907139 |
| 0.289464611 | 0.711649460 | 18.71984409 | 14.42017271 | 527.8669 | 841.7101 | 0.127061109 | 0.77589891 | 0.193807544 |
| 0.30601087 | 0.199646289 | 17.136058074 | 11.18019216 | 527.3859 | 7257.5107 | 0.817084413 | 0.187915087 | 0.258902373 |
| 0.322254848 | 0.186504949 | 25.13587815 | 14.57858606 | 815.2859 | 1687.3907 | 0.216257931 | 0.783724069 | 0.351417018 |
| 0.321235682 | 0.191706061 | 25.28764981 | 15.77119121 | 457.5569 | 1178.3907 | 0.203956512 | 0.79903408 | 0.35788387 |
| 0.388810726 | 0.141114244 | 26.50712939 | 9.585768583 | 1532.2659 | 88.7907 | 0.055356083 | 0.944434917 | 0.569992158 |
| 0.360684944 | 0.173449174 | 77.60147191 | 19.94078329 | 997.5059 | 2118.4907 | 0.431178536 | 0.648017164 | 0.104875171 |
| 0.2441257 | 0.266959091 | 13.813408693 | 15.71713037 | 115.4059 | 1892.2107 | 0.942515099 | 0.074840434 | 0.458600727 |
| 0.2130696205 | 0.289489313 | 12.35957959 | 16.81126026 | 186.3859 | 2084.6907 | 0.925240105 | 0.07435985 | 0.463640569 |
| 0.222739956 | 0.278833274 | 14.25532721 | 17.8452951 | 86.6259 | 1754.1707 | 0.95294108 | 0.04705982 | 0.480987739 |
| 0.234030261 | 0.2686501502 | 18.72181721 | 21.2030815 | 1795.0459 | 1743.8107 | 0.49781052 | 0.572738948 | 0.039091792 |
| 0.200738062 | 0.300991005 | 15.48409373 | 22.8731616 | 899.6459 | 1484.7507 | 0.631311995 | 0.366686109 | 0.181945382 |
| 0.450761616 | 0.110795075 | 78.48674468 | 9.911100786 | 189.3259 | 292.5107 | 0.803117162 | 0.179282818 | 0.183786889 |
| 0.347791794 | 0.168314293 | 24.4992174 | 11.950531477 | 1407.8459 | 193.1107 | 0.120951517 | 0.879248483 | 0.468787734 |
| 0.353989925 | 0.164048876 | 26.90323431 | 12.4677157 | 127.9059 | 147.5707 | 0.130388816 | 0.8911184 | 0.49102365 |
| 0.472221202 | 0.097853735 | 26.91655981 | 5.577662920 | 820.8159 | 1298.9907 | 0.612778892 | 0.387212038 | 0.074105491 |
| 0.403830009 | 0.132877596 | 23.820597052 | 7.839778171 | 251.6059 | 893.9707 | 0.780367459 | 0.219632541 | 0.144881252 |
| 0.401147996 | 0.202449461 | 77.3081719405 | 15.47443454 | 914.8059 | 584.0707 | 0.470986804 | 0.620614191 | 0.1663817908 |
| 0.378941471 | 0.147777029 | 26.52590297 | 10.34439201 | 276.1859 | 574.6107 | 0.677532968 | 0.324620362 | 0.059797417 |
| 0.501255023 | 0.085267703 | 32.008032145 | 5.457129363 | 857.0659 | 538.8107 | 0.38601671 | 0.613985329 | 0.321991989 |
| 0.380025626 | 0.145244343 | 21.0661096 | 7.988138861 | 2969.8859 | 1565.1307 | 0.345121277 | 0.645878727 | 0.277769369 |
| 0.300501555 | 0.2004242105 | 18.803644805 | 12.42574844 | 1552.5259 | 8958.8107 | 0.605146679 | 0.348551313 | 0.187161846 |
| 0.354842245 | 0.086214605 | 24.1707575 | 4.535938648 | 186.0259 | 1374.4107 | 0.865851543 | 0.074836657 | 0.172557552 |
| 0.489117251 | 0.10198576 | 53.15848754 | 6.18175475 | 401.1759 | 865.6107 | 0.870729448 | 0.641644757 | 0.184814473 |
| 0.471739957 | 0.096444719 | 7.564661976 | 5.554505674 | 985.8059 | 1482.4907 | 0.6512776919 | 0.558419963 | 0.4263531895 |
| 0.380025626 | 0.145244343 | 21.0661096 | 7.988138861 | 1856.2259 | 231.8307 | 0.161110593 | 0.8636865407 | 0.468055405 |
| 0.4016101745 | 0.13116065 | 29.71852916 | 9.927886603 | 843.3059 | 113.7707 | 0.118619898 | 0.883560102 | 0.517280859 |
| 0.363583621 | 0.157625709 | 26.514160437 | 11.50636778 | 1266.5459 | 117.2107 | 0.084740709 | 0.61525951 | 0.518274247 |
| 0.401052544 | 0.134270158 | 74.49083986 | 19.818551607 | 743.2059 | 764.5907 | 0.7546464059 | 0.454099441 | 0.378063034 |
| 0.401930051 | 0.118619976 | 25.758046017 | 7.14916944 | 1794.1616 | 806.9807 | 0.41164679 | 0.86448448 | 0.539464676 |
| 0.338725457 | 0.174722953 | 25.74313476 | 13.27894445 | 4130.2259 | 744.0507 | 0.152648436 | 0.847351564 | 0.429352816 |
| 0.40752171 | 0.108967902 | 20.96545977 | 5.178785235 | 1035.2059 | 85.8107 | 0.7857547216 | 0.623375278 | 0.593199191 |
| 0.537889831 | 0.071058239 | 22.27093604 | 4.265113631 | 660.9259 | 962.8997 | 0.529979958 | 0.67520012 | 0.140101889 |
| 0.459747446 | 0.1036591919 | 31.72566686 | 7.152120387 | 766.7659 | 205.9907 | 0.2117597956 | 0.788240244 | 0.466286958 |
| 0.406676051 | 0.199676079 | 75.094589975 | 16.469493113 | 789.4259 | 2726.7107 | 0.751015246 | 0.429364674 | 0.496189185 |
| 0.392952926 | 0.139233777 | 26.32784601 | 15.528663092 | 1154.1259 | 64.5907 | 0.05299895 | 0.740100105 | 0.573800624 |
| 0.195637332 | 0.3110151528 | 16.23787367 | 25.18162082 | 1938.9459 | 2833.4507 | 0.598422667 | 0.40577333 | 0.151917918 |
| 0.100115066 | 0.167294601 | 7.102028032 | 33.17791668 | 303.1259 | 2028.0507 | 0.869968671 | 0.13001129 | 0.552558208 |
| 0.081090909 | 0.511561598 | 5.027636731 | 31.71618905 | 123.6259 | 1743.5907 | 0.93371134 | 0.066208655 | 0.649026689 |
| 0.137482728 | 0.385909799 | 8.521916753 | 24.54640753 | 25.0059 | 1572.8967 | 0.98454507 | 0.151649629 | 0.61564375 |
| 0.41519748 | 0.197193474 | 19.81854844 | 17.114842748 | 166.0059 | 1992.0907 | 0.99414694 | 0.05946041 | 0.998661474 |
| 0.2444941 | 0.174055504 | 14.50623407 | 13.9964896 | 720.0659 | 2718.7507 | 0.890611963 | 0.103464864 | 0.393664480 |
| 0.031996051 | 0.118619976 | 25.758046017 | 7.14916944 | 106.6459 | 2106.1107 | 0.95184795 | 0.048152425 | 0.810375649 |
| 0.164961168 | 0.353165131 | 12.01661521 | 25.78105456 | 545.0259 | 2106.8307 | 0.760707033 | 0.252999495 | 0.388474017 |
| 0.055593001 | 0.587222936 | 3.196612098 | 3.196619897 | 399.5169 | 2169.8779 | 0.88806109 | 0.11135911 | 0.652107556 |
| 0.120442759 | 0.426345478 | 8.31050367 | 29.41783796 | 613.1059 | 2285.0507 | 0.788449699 | 0.211550301 | 0.441401059 |
| 0.111808042 | 0.472891728 | 7.874476041 | 29.7733644 | 885.7619 | 2994.8569 | 0.719424 | 0.78714468 | 0.42634468 |
| 0.138317684 | 0.394495975 | 9.682237854 | 27.81471824 | 538.3859 | 1898.0107 | 0.779023702 | 0.202976298 | 0.407112848 |
| 0.136063603 | 0.38971313 | 9.791613784 | 28.68295057 | 701.1259 | 2225.1507 | 0.76061308 | 0.239986592 | 0.391572141 |
| 0.106239945 | 0.154141259 | 7.434695145 | 31.80888195 | 269.2859 | 1748.8307 | 0.868552513 | 0.133474878 | 0.54065384 |
| 0.055714614 | 0.354930513 | 31.540965258 | 35.906826427 | 106.1059 | 1599.3507 | 0.937717157 | 0.06208643 | 0.698377969 |
| 0.154680765 | 0.3641637196 | 17.22945079 | 78.44411137 | 1597.7019 | 3419.1107 | 0.81019494 | 0.440615008 | 0.2999101019 |
| 0.130688686 | 0.407670883 | 8.756141959 | 8.756141959 | 741.6659 | 2419.9107 | 0.705412643 | 0.234587357 | 0.409395741 |
| 0.082874893 | 0.508296615 | 4.86624288 | 24.54640753 | 340.6493 | 2493.0507 | 0.859945572 | 0.124055428 | 0.608753533 |
| 0.145619572 | 0.155941422 | 5.595206169 | 24.1649635 | 781.9859 | 4176.0907 | 0.871348203 | 0.157719608 | 0.517573737 |
| 0.68125528 | 0.566136856 | 3.92291774 | 36.32327587 | 1056.5259 | 336.0730 | 0.877374244 | 0.262625756 | 0.625799708 |
| 0.154192259 | 0.168485915 | 20.65536564 | 20.65536564 | 942.4859 | 4171.8070 | 0.813768882 | 0.186251151 | 0.42107566 |
| 0.120130415 | 0.426933719 | 8.521916753 | 30.10784908 | 1070.8859 | 4014.5107 | 0.789413994 | 0.210580606 | 0.442821046 |
| 0.111470136 | 0.443917498 | 7.111407107 | 76.4688177 | 1071.3499 | 4901.6707 | 0.709515805 | 0.170721975 | 0.458101090 |
| 0.111710197 | 0.444714794 | 6.11170471 | 74.43571769 | 164.7659 | 7818.7507 | 0.836467175 | 0.141615787 | 0.217406460 |
| 0.100130827 | 0.467300511 | 10.21052715 | 12.67357539 | 1056.2459 | 432.2507 | 0.707963819 | 0.253698177 | 0.573465241 |
| 0.078163581 | 0.510008831 | 4.611641537 | 30.62152096 | 296.1659 | 2132.0507 | 0.878031515 | 0.213568485 | 0.598454180 |
| 0.165895595 | 0.351596561 | 6.98876977 | 14.76705555 | 1520.5598 | 5301.1107 | 0.77721253 | 0.222767147 | 0.371689112 |
| 0.063008215 | 0.560758754 | 4.037261748 | 35.88886026 | 472.8859 | 2856.1307 | 0.857958806 | 0.142401194 | 0.606879706 |
| 0.106967811 | 0.459784184 | 7.946714959 | 47.1174107 | 8.59411137 | 28.705074436 | 0.132750544 | 0.435515161 | 0.146611150 |
| 0.212040498 | 0.510717429 | 8.619464601 | 11.35420474 | 4179.5207 | 9985.7507 | 0.854484364 | 0.074508468 | 0.738994979 |
| 0.130688686 | 0.405469894 | 7.144613036 | 31.64619703 | 815.7659 | 4108.1107 | 0.863615826 | 0.15369174 | 0.417761065 |
| 0.0534672336 | 0.509991609 | 3.101378109 | 4.27755334 | 544.5895 | 2492.7607 | 0.846173098 | 0.153297708 | 0.533977236 |
| 0.139005153 | 0.319512805 | 6.61123566 | 11.18294817 | 2664.7459 | 7343.9907 | 0.733780105 | 0.266241985 | 0.299012652 |
| 0.164683886 | 0.353169351 | 8.399260263 | 18.1163692 | 12.924959 | 5271.5907 | 0.78570593 | 0.213293051 | 0.32686882 |
| 0.0295112 | 0.628156962 | 2.622061533 | 38.31587668 | 373.0659 | 3073.9707 | 0.837171993 | 0.18282007 | 0.688526768 |
| 0.156982795 | 0.348268753 | 8.55712100 | 17.76170613 | 1485.1859 | 5193.4907 | 0.776227275 | 0.222772725 | 0.36776572 |
| 0.056554598 | 0.580929328 | 3.788180155 | 38.92265 | 348.5459 | 2626.6907 | 0.88285103 | 0.117148699 | 0.645039823 |
| 0.118431793 | 0.408184691 | 6.63171312 | 24.09251069 | 772.5459 | 4027.9707 | 0.808904273 | 0.16063577 | 0.4094951173 |
| 0.137900441 | 0.395150561 | 9.241329752 | 26.1705563 | 576.0859 | 2501.1507 | 0.81288997 | 0.187131003 | 0.441179115 |
| 0.108393373 | 0.449630396 | 8.28278 | | | | | | |

Sheet 5 (iterasi 5)

| U1 | U2 | U1^2 | U2^2 | Jarak D1 | Jarak D2 | F-Objektif |
|----------|-----------|-------------|--------------|-----------|-------------|--------------|
| 0.465517 | 0.285714 | 0.916666667 | 0.789173684 | 0.036585 | 0.31275 | 2.337707241 |
| 0.224138 | 0.2 | 1 | 0.631578947 | 0 | 0.34375 | 2.399466878 |
| 0.827586 | 0.819048 | 0 | 0.842105269 | 0.379268 | 0.40025 | 3.224257382 |
| 0.67214 | 0.638095 | 0.166666667 | 0.368421059 | 0.268293 | 0.31275 | 2.476389433 |
| 0.5 | 0.3333333 | 0.333333333 | 0.109263158 | 0.262195 | 0 | 1.534124947 |
| 0.87931 | 0.790476 | 0.25 | 0.421052632 | 0.661634 | 0.375 | 3.380473313 |
| 0.931034 | 0.895238 | 0.166666667 | 0.473684211 | 0.542683 | 0.5 | 3.508306382 |
| 0.700997 | 0.628571 | 0.416666667 | 0.157894737 | 0.451722 | 0.1875 | 2.549748896 |
| 1 | 1 | 0.5 | 0.842105269 | 0.347561 | 0.75 | 4.439666239 |
| 0.551724 | 0.390476 | 0.166666667 | 0.315789474 | 0.237805 | 0.5 | 2.416461347 |
| 0.534483 | 0.371429 | 0.333333333 | 0.368421059 | 0.231707 | 0.5 | 2.339373033 |
| 0.637931 | 0.4 | 0.333333333 | 0.421052632 | 0.237805 | 0.53125 | 2.561371877 |
| 0.913793 | 0.828571 | 0.416666667 | 0.842105263 | 0.243902 | 0.75 | 3.995038801 |
| 0.844029 | 0.773481 | 0.166666667 | 0.526315789 | 0.179512 | 0.56275 | 4.546417673 |
| 0.648753 | 0.575881 | 0.416666667 | 0.115789473 | 0.279898 | 0.1875 | 2.727982463 |
| 0.758621 | 0.72381 | 0.416666667 | 0.315789474 | 0.396341 | 0.21875 | 2.829977817 |
| 0.844828 | 0.695238 | 0.333333333 | 0.421052632 | 0.390244 | 0.175 | 3.122195549 |
| 0.517241 | 0.3333333 | 0.333333333 | 0.210526316 | 0.378048 | 0.28125 | 2.05773142 |
| 0.551724 | 0.552381 | 0.333333333 | 0.210526316 | 0.297683 | 0.1125 | 2.065647666 |
| 0.844828 | 0.704762 | 0.416666667 | 0.263157899 | 0.517078 | 0.156275 | 2.702737228 |
| 0.741379 | 0.590476 | 0.333333333 | 0.263157895 | 0.29878 | 0.40625 | 2.633377217 |
| 0.637931 | 0.418095 | 0.333333333 | 0.842105269 | 0.408537 | 0.46875 | 3.128751454 |
| 0.482759 | 0.333333 | 0.25 | 0.421052632 | 0.554878 | 0.375 | 2.417022634 |
| 0.586007 | 0.438095 | 0.5 | 0.315789474 | 1 | 0.025 | 3.400016168 |
| 0.482759 | 0.390476 | 0.416666667 | 0.421052632 | 0.2702458 | 0.46875 | 3.171346396 |
| 0.709991 | 0.476169 | 0.416666667 | 0.763157899 | 0.384146 | 0.7175 | 2.463607703 |
| 0.534483 | 0.32381 | 0.25 | 0.631578947 | 0.259756 | 0.71875 | 2.818377327 |
| 0.655172 | 0.485714 | 0.333333333 | 0.421052632 | 0.487825 | 0.375 | 2.758077542 |
| 0.810495 | 0.609524 | 0.583333333 | 0.526315789 | 0.381426 | 0.175 | 3.351164101 |
| 0.793103 | 0.695238 | 0.333333333 | 0.526315789 | 0.396341 | 0.5 | 3.244333213 |
| 0.586007 | 0.478571 | 0.416666667 | 0.764157899 | 0.57449 | 0.75 | 2.746499914 |
| 0.586006 | 0.390476 | 0.25 | 0.473684211 | 0.487805 | 0.4375 | 2.008430796 |
| 0.844828 | 0.72381 | 0.416666667 | 0.473684211 | 0.591483 | 0.5 | 3.550451402 |
| 0.721138 | 0.552381 | 0.333333333 | 0.526315789 | 0.426829 | 0.5 | 3.062997275 |
| 0.586006 | 0.371429 | 0.166666667 | 0.421052632 | 0.378048 | 0.40625 | 2.312412167 |
| 0.774138 | 0.533333 | 0.25 | 0.315789474 | 0.396341 | 0.21875 | 2.438352203 |
| 0.948676 | 0.784545 | 0.5 | 0.763157899 | 0.682799 | 0.54875 | 3.846401814 |
| 0.689655 | 0.666667 | 0.416666667 | 0.315789474 | 0.408537 | 0.46875 | 2.968064565 |
| 0.965517 | 0.828571 | 0.5 | 0.315789474 | 0.152429 | 0.375 | 3.137317168 |
| 0.758621 | 0.571429 | 0.5 | 0.263157899 | 0.170722 | 0.3125 | 2.578438863 |
| 0.603448 | 0.542857 | 0.5 | 0.263157895 | 0.20122 | 0.25 | 2.305682826 |
| 0.603448 | 0.466667 | 0.5 | 0.210526316 | 0.731102 | 0.34875 | 2.45649675 |
| 0.62069 | 0.409524 | 0.5 | 0.263157899 | 0.404027 | 0.244662195 | 0.517241 |
| 0.482759 | 0.342857 | 0.5 | 0.263157899 | 0.237805 | 0.40625 | 2.267311295 |
| 0.534483 | 0.485714 | 0.416666667 | 0.263157899 | 0.18902 | 0.375 | 2.264045996 |
| 0.517241 | 0.380952 | 0.416666667 | 0.421052632 | 0.121416 | 0.625 | 2.4995994 |
| 0.793103 | 0.514265 | 0.416666667 | 0.789173684 | 0.20122 | 1 | 3.717970626 |
| 0.62269 | 0.447619 | 0.416666667 | 0.368421059 | 0.121951 | 0.3475 | 2.319097642 |
| 0.724138 | 0.657143 | 0.416666667 | 0.421052632 | 0.152439 | 0.59875 | 2.965189113 |
| 0.677214 | 0.638095 | 0.5 | 0.631578947 | 0.171791 | 0.875 | 3.439099198 |
| 0.741379 | 0.666667 | 0.5 | 0.421052632 | 0.176829 | 0.46875 | 2.974677877 |
| 0.775862 | 0.666667 | 0.5 | 0.631578947 | 0.158537 | 0.625 | 3.357641268 |
| 0.741379 | 0.571429 | 0.5 | 0.526315789 | 0.195122 | 0.6875 | 3.221745632 |
| 0.663448 | 0.542857 | 0.5 | 0.421052632 | 0.213415 | 0.605 | 2.958404263 |
| 0.8781 | 0.704762 | 0.5 | 0.894797842 | 0.103609 | 0.8125 | 3.894961628 |
| 0.898655 | 0.666667 | 0.666666667 | 0.473684211 | 0.152439 | 0.78125 | 3.430361741 |
| 0.551724 | 0.361905 | 0.583333333 | 0.473684211 | 0.170732 | 0.59275 | 2.735128151 |
| 0.482759 | 0.342857 | 0.583333333 | 0.473684211 | 0.10975 | 0.4375 | 2.395066864 |
| 0.637931 | 0.428571 | 0.5 | 0.579847768 | 0.121951 | 0.65625 | 2.923651051 |
| 0.5 | 0.276175 | 0.5 | 0.684210526 | 0.164361 | 0.8125 | 2.6691242466 |
| 0.789991 | 0.517453 | 0.333333333 | 0.309479784 | 0.071461 | 0.9375 | 3.578980095 |
| 0.850911 | 0.419148 | 0.5 | 0.894797842 | 0.097146 | 1 | 3.414546477 |
| 0.482759 | 0.342857 | 0.333333333 | 0.315789474 | 0.1238049 | 0.75 | 1.852787557 |
| 0.62369 | 0.409524 | 0.5 | 0.157894737 | 0.158537 | 0.125 | 1.371644787 |
| 0.551724 | 0.590476 | 0.5 | 0.315789474 | 0.170722 | 0.3125 | 2.414221509 |
| 0.258621 | 0.314286 | 0.416666667 | 0 | 0.097584 | 0.03125 | 1.118384046 |
| 0.637931 | 0.561905 | 0.416666667 | 0.473684211 | 0.121951 | 0.5625 | 2.774637893 |
| 0.708671 | 0.619048 | 0.5 | 0.631578947 | 0.19976 | 0.59375 | 3.212795854 |
| 0.20609 | 0 | 0 | 0.109263158 | 0.029975 | 0.125 | 0.820053035 |
| 0 | 0.095238 | 0.5 | 0 | 0.079368 | 0.1875 | 0.820053038 |
| 0.241379 | 0.132333 | 0.416666667 | 0.0852631579 | 0.085366 | 0.15625 | 1.289526773 |
| 0.323134 | 0.210948 | 0.5 | 0.1083421588 | 0.170722 | 0.35 | 1.676807667 |
| 0.534483 | 0.371429 | 0.5 | 0.526315789 | 0.134146 | 0.875 | 2.841373461 |
| 0.431034 | 0.228571 | 0.416666667 | 0.368421059 | 0.085366 | 0.4375 | 1.967559948 |
| 0.698655 | 0.428571 | 0.5 | 1 | 0.182997 | 1 | 3.801153434 |
| 0.482759 | 0.466667 | 0.5 | 0.684210519 | 0.117449 | 0.78675 | 3.409997732 |
| 0.551724 | 0.342857 | 0.416666667 | 0.368421059 | 0.170732 | 0.6875 | 2.535900707 |
| 0.5 | 0.4 | 0.5 | 0.210526316 | 0.22561 | 0.375 | 2.211136072 |
| 0.603448 | 0.476169 | 0.5 | 0.526315789 | 0.213415 | 0.71875 | 3.03819176 |
| 0.62269 | 0.457143 | 0.5 | 0.210526316 | 0.22561 | 0.175 | 2.2111827 |
| 0.689655 | 0.485714 | 0.416666667 | 0 | 0.182997 | 1 | 3.77962954 |
| 0.62269 | 0.457143 | 0.583333333 | 0.421052632 | 0.22561 | 0.71875 | 3.26578233 |
| 0.741379 | 0.514286 | 0.5 | 0.947368421 | 0.164634 | 0.90625 | 4.028917992 |
| 0.562091 | 0.704762 | 0.5 | 0.736947719 | 0.376498 | 1 | 4.144248872 |
| 0.465517 | 0.295238 | 0.416666667 | 0.261357895 | 0.1328049 | 0.375 | 1.948268679 |
| 0.534483 | 0.495238 | 0.416666667 | 0.789473684 | 0.134146 | 0.6875 | 3.057507546 |
| 0.137531 | 0.171429 | 0.416666667 | 0.421052632 | 0.067073 | 0.375 | 1.588152075 |
| 0.11792 | 0.219048 | 0.666666667 | 0.421052632 | 0.109756 | 0.65625 | 2.18556118 |
| 0.586207 | 0.438095 | 0.5 | 0.579847768 | 0.134146 | 0.59375 | 2.831145845 |
| 0.413793 | 0.238095 | 0.416666667 | 0.684210526 | 0.115858 | 0.90625 | 2.74869193 |
| 0.689655 | 0.527383 | 0.5 | 0.315789474 | 0.140249 | 0.625 | 2.704948072 |
| 0.5 | 0.314286 | 0.5 | 0.4/6064211 | 0.1738049 | 0.6875 | 2.140518703 |
| 0.446517 | 0.342857 | 0.416666667 | 0.157894737 | 0.138537 | 0.1875 | 1.728973739 |
| 0.913793 | 0.809524 | 0.583333333 | 0.261357895 | 0.131416 | 0.25 | 2.952095483 |
| 0.311379 | 0.210948 | 0.5 | 0.472681211 | 0.039756 | 0.1375 | 1.391367237 |
| 0.465517 | 0.32381 | 0.5 | 0.368421059 | 0.087561 | 0.59375 | 2.310567873 |
| 0.448276 | 0.409524 | 0.5 | 0.315789474 | 0.146341 | 0.5 | 2.319930609 |

| (u1)^m | (u2)^m | (u1)^m.X | (u2)^m.X | d1^2 | d2^2 | u1 Baru | u2 Baru | Selisih |
|--------------|--------------|--------------|---------------|--------------|-------------|------------|-------------|--------------|
| 0.60603209 | 0.049072766 | 32.7236582 | 2.649039351 | 10186.0884 | 10381.37 | 0.5097474 | 0.4992526 | 0.373738864 |
| 0.53458957 | 0.072284292 | 21.28278106 | 2.899371694 | 9064.371532 | 9511.944 | 0.5120469 | 0.48795314 | 0.210905758 |
| 0.105918633 | 0.455015774 | 7.94389716 | 34.12618307 | 25223.16371 | 25040.01 | 0.4981781 | 0.5018219 | 0.172727687 |
| 0.522239079 | 0.07691686 | 34.6777921 | 5.076512778 | 18817.13244 | 18282.17 | 0.4997216 | 0.5002762 | 0.222993937 |
| 0.659781095 | 0.035212268 | 38.6309113 | 1.577788688 | 12393.76224 | 12552 | 0.5031518 | 0.49680835 | 0.08882764 |
| 0.04676793 | 0.61425183 | 3.54786412 | 47.79162716 | 35282.17447 | 35041.96 | 0.4983135 | 0.5018868 | 0.282055587 |
| 0.04038052 | 0.638470496 | 3.271065098 | 51.71611015 | 32806.1852 | 3351.91 | 0.4978067 | 0.50216321 | 0.296880179 |
| 0.0003064296 | 0.8925213 | 2.208372124 | 60.67994182 | 22325.80527 | 23168.8 | 0.4993857 | 0.502061425 | 0.44402987 |
| 0.123326224 | 0.420969552 | 10.4822801 | 35.7824119 | 32583.5329 | 32220.18 | 0.4971965 | 0.50280351 | 0.146018158 |
| 0.88836347 | 0.053030414 | 52.12818447 | 19.49860431 | 13759.773 | 13864.95 | 0.5019367 | 0.4980926 | 0.404632222 |
| 0.865113497 | 0.055585468 | 49.6545828 | 0.323957116 | 13252.43608 | 13375.64 | 0.5023134 | 0.4978666 | 0.42295964 |
| 0.90806702 | 0.052214542 | 58.58118892 | 0.141730685 | 13946.4576 | 13979.54 | 0.502699 | 0.49973021 | 0.42671295 |
| 0.242813454 | 0.257291351 | 19.42507633 | 20.58303805 | 20299.84831 | 24756.6 | 0.497258 | 0.50274424 | 0.044494706 |
| 0.401092842 | 0.134455027 | 30.4838526 | 10.21588164 | 21346.50063 | 21145.33 | 0.4996129 | 0.5028616 | 0.135659607 |
| 0.651526174 | 0.03718276 | 41.469767196 | 2.379966051 | 16978.476 | 16993.54 | 0.5002219 | 0.4997809 | 0.369494768 |
| 0.014699969 | 0.777276296 | 1.058618128 | 54.86365674 | 7417.816163 | 74017.75 | 0.4984049 | 0.5011196 | 0.37894822 |
| 0.01109277 | 0.98101648 | 8.072074893 | 61.0107942869 | 74081.6586 | 74404.54 | 0.49767 | 0.5027376 | 0.393917981 |
| 0.874791776 | 0.149494541 | 21.402472658 | 8.940619947 | 17490.01916 | 17541.57 | 0.5017586 | 0.4971144 | 0.119481779 |
| 0.64087785 | 0.046873848 | 8.579749786 | 7.846168741 | 17786.777 | 17931.95 | 0.5015160 | 0.4998480 | 0.278870975 |
| 0.144934446 | 0.895110403 | 10.99901032 | 29.72721625 | 21715.50063 | 21514.33 | 0.4976733 | 0.5027267 | 0.118286451 |
| 0.465137656 | 0.105378379 | 11.29963591 | 7.376886495 | 18747.47911 | 18604.54 | 0.4987561 | 0.50124387 | 0.176623505 |
| 0.14899729 | 0.376993948 | 5.53586557 | 24.1276918 | 18800.4576 | 18815.54 | 0.5020200 | 0.49995958 | 0.14198746 |
| 0.139108638 | 0.428866148 | 5.553978102 | 23.58768312 | 20994.42532 | 21173.69 | 0.5012102 | 0.49789804 | 0.158986931 |
| 0.133332343 | 0.403038485 | 8.133266832 | 24.58334761 | 44597.44684 | 44665.59 | 0.5023873 | 0.49961272 | 0.135240397 |
| 0.827233622 | 0.00817554 | 52.24996405 | 0.521334146 | 14611.576 | 14626.54 | 0.5022578 | 0.49974215 | 0.09323498 |
| 0.154076066 | 0.36902558 | 10.2377251 | 0.25937397 | 18203.80527 | 18148.6 | 0.4992159 | 0.5007841 | 0.06969061 |
| 0.42415668 | 0.121610464 | 24.4610843 | 5.703406913 | 18571.43608 | 18587.64 | 0.5019478 | 0.4980522 | 0.149325298 |
| 0.026605066 | 0.709303879 | 1.723932968 | 5.52495211 | 21581.79452 | 21578.85 | 0.4999585 | 0.50003409 | 0.336865515 |
| 0.01358625 | 0.780676153 | 1.00310995 | 57.77020551 | 21828.82679 | 21661.7 | 0.4961017 | 0.5018627 | 0.381661895 |
| 0.007171788 | 0.83776547 | 0.522766803 | 61.156879792 | 23931.18987 | 23796.38 | 0.496159 | 0.50151072 | 0.413751569 |
| 0.06489606 | 0.555480945 | 1.357012891 | 33.8833766 | 21190.44681 | 21559.59 | 0.5020093 | 0.49919699 | 0.261608955 |
| 0.099918595 | 0.168915995 | 5.577883727 | 28.1070597 | 19822.10992 | 19909.27 | 0.5010969 | 0.49890112 | 0.185515669 |
| 0.0232301545 | 0.718094673 | 1.770917423 | 54.5683551 | 31067.50063 | 30866.33 | 0.4983769 | 0.50162407 | 0.425737495 |
| 0.005859746 | 0.85276504 | 0.404303805 | 58.8078803 | 21448.14219 | 21373.12 | 0.499124 | 0.50087603 | 0.422576755 |
| 0.531625231 | 0.185663134 | 16339.10992 | 16226.27 | 5013465 | 4986535 | 0.49613455 | 0.50169539 | 0.091613455 |
| 0.048482194 | 0.61232683 | 1.2594111996 | 42.87126511 | 15929.14219 | 14954.12 | 0.4990377 | 0.50096228 | 0.282727968 |
| 0.066056078 | 0.552026262 | 5.416663972 | 45.26615054 | 40529.5215 | 42022.23 | 0.4980848 | 0.50191513 | 0.241069539 |
| 0.002680889 | 0.896811998 | 0.188105452 | 60.08933626 | 23378.46835 | 23399.48 | 0.4995828 | 0.502041723 | 0.446538822 |
| 0.353105835 | 0.1644651995 | 9.39374284 | 13.66611161 | 22629.89096 | 22301.55 | 0.4963575 | 0.50466246 | 0.0978991925 |
| 0.27668056 | 0.010481836 | 5.87663483 | 1.20067919 | 16037.49 | 15977.5 | 0.4987664 | 0.50263344 | 0.37170245 |
| 0.75760687 | 0.010481836 | 5.87663483 | 1.20067919 | 16037.49 | 15977.5 | 0.4987664 | 0.50263344 | 0.37170245 |
| 0.808948497 | 0.003484899 | 4.011474574 | 0.015788961 | 14851.05916 | 14858.0 | 0.4999799 | 0.49914019 | 0.48486999 |
| 0.17191625 | 0.087140525 | 1.41610301 | 0.10031101 | 14161.71830 | 14171.73 | 0.4957304 | 0.49717050 | 0.071650898 |
| 0.301569885 | 0.010110179 | 4.274146460 | 0.10210793 | 17065.09916 | 16902.53 | 0.4973790 | 0.49717460 | 0.072001119 |
| 0.0036115807 | 0.027431866 | 5.725488088 | 0.154482047 | 14466.43628 | 14589.64 | 0.5012101 | 0.49717994 | 0.449717637 |
| 0.164948803 | 0.031517474 | 4.835265976 | 0.098395771 | 17299.09916 | 17240.53 | 0.4982435 | 0.49714387 | 0.2 |
| 0.63054773 | 0.032420715 | 46.40999474 | 3.095571914 | 17170.48987 | 17033.38 | 0.4948489 | 0.50215100 | 0.296272112 |
| 0.298865876 | 0.012579048 | 49.49684408 | 0.098363839 | 17088.12068 | 17084.22 | 0.5002452 | 0.49935479 | 0.387481888 |
| 0.621652928 | 0.04475353 | 42.839405206 | 3.08799349 | 18169.14219 | 18121.17 | 0.4989671 | 0.50103292 | 0.2894842615 |
| 0.595745541 | 0.052054457 | 39.31920568 | 3.435594144 | 18224.13144 | 18203.17 | 0.4997123 | 0.50208774 | 0.2721133286 |
| 0.606877929 | 0.048830524 | 42.4814503 | 3.418166865 | 18652.47911 | 18559.43 | 0.4987498 | 0.50125022 | 0.280273792 |
| 0.578213343 | 0.057406527 | 41.63136071 | 4.133362998 | 18885.15295 | 18785.07 | 0.4982853 | 0.5017471 | 0.262118113 |
| 0.750918232 | 0.017808232 | 5.2563928 | 1.2729632 | 17290.47911 | 17197.43 | 0.498851 | 0.50131899 | 0.36791477 |
| 0.87951538 | 0.00368688 | 5.426510995 | 0.23993166 | 16720.78376 | 16771.8 | 0.5007631 | 0.49923682 | 0.437082621 |
| 0.47881206 | 0.09478611 | 37.37197077 | 7.400111688 | 19995.174747 | 19717.96 | 0.4970104 | 0.50298857 | 0.191973963 |
| 0.058556512 | 0.055021228 | 38.2522861 | 3.687028295 | 19951.48835 | 19115.18 | 0.4998107 | 0.50509922 | 0.262951273 |
| 0.020216677 | 0.01082752 | 17.41028392 | 0.638219 | 12639.77 | 12744.95 | 0.502017 | 0.4979282 | 0.303872838 |
| 0.709163628 | 0.0237512 | 1.218100697 | 11.218100697 | 11267.75148 | 11169.05 | 0.5016868 | 0.49511565 | 0.37255841 |
| 0.762762527 | 0.016031082 | 8.81810845 | 0.126181258 | 12823.1286 | 12894.51 | 0.5020283 | 0.49971633 | 0.372090065 |
| 0.662187243 | 0.034884979 | 37.008248559 | 1.20411141 | 14192.62082 | 13922.1352 | 0.5035317 | 0.49961683 | 0.310217183 |
| 0.62182879 | 0.014341912 | 44.25459915 | 3.134817618 | 14524.81620 | 14341.3751 | 0.4980674 | 0.5019286 | 0.279137996 |
| 0.639063112 | 0.004024994 | 38.3799851 | 2.455183516 | 13598.44686 | 13667.58 | 0.5012679 | 0.49873211 | 0.28110834 |
| 0.728705881 | 0.021420426 | 40.07882305 | 1.718750508 | 17080.42532 | 1957.69 | 0.5049727 | 0.495652647 | 0.495564567 |
| 0.792362498 | 0.012067581 | 49.91883737 | 0.760257959 | 12826.12068 | 12319.22 | 0.5056728 | 0.4993724 | 0.384708474 |
| 0.770993941 | 0.014876311 | 45.48542114 | 0.877702369 | 16406.773 | 16511.95 | 0.5015876 | 0.49884024 | 0.376433932 |
| 0.604065917 | 0.049634257 | 25.357049333 | 2.084638779 | 9978.04537 | 10389.58 | 0.5102156 | 0.498974741 | 0.1 |
| 0.760693313 | 0.000157507 | 47.12997205 | 1.295144846 | 15571.71576 | 15586.54 | 0.502042 | 0.49975804 | 0.3571685 |
| 0.62176506 | 0.04777675 | 44.6678932 | 3.037149716 | 17068.81603 | 16957.75 | 0.49893679 | 0.5016520 | 0.294866631 |
| 0.482974174 | 0.095364067 | 18.26279397 | 0.84123799 | 6044.346407 | 6009.628 | 0.5184441 | 0.4931548 | 0.313998981 |
| 0.486960703 | 0.01391892 | 15.1448141 | 2.446534036 | 8862.91958 | 8944.852 | 0.517577 | 0.4947220 | 0.17047853 |
| 0.743751603 | 0.011714949 | 22.740989648 | 2.918216189 | 17194.64664 | 17013.73 | 0.4987401 | 0.49669741 | 0.311947714 |
| 0.646682474 | 0.00405079 | 53.8387654 | 2.719642664 | 17934.43628 | 17944.74 | 0.5019442 | 0.49777733 | 0.34817958 |
| 0.646484738 | 0.053570454 | 44.78703703 | 2.273911743 | 13401.40685 | 13508.48 | 0.4973864 | 0.5020355 | 0.318731109 |
| 0.730745473 | 0.032474191 | 4.545842785 | 0.132044665 | 17320.47673 | 1737.55 | 0.5027403 | 0.4997313 | 0.342371394 |
| 0.720917048 | 0.023470913 | 4.582484735 | 0.18766894 | 12488.77669 | 13235.99 | 0.5021376 | 0.4970624 | 0.375862374 |
| 0.739742602 | 0.005248979 | 48.3511668 | 0.239734011 | 13554.76224 | 13714.90259 | 0.50473801 | 0.493100965 | 0.31 |
| 0.864484008 | 0.003534858 | 54.83335851 | 0.22010602 | 11613.78376 | 11564.93 | 0.503392 | 0.4991828 | 0.349913072 |
| 0.762505368 | 0.016074803 | 41.9379795 | 0.884086695 | 12575.42352 | 13522.56 | 0.5024532 | 0.49971802 | 0.346883339 |
| 0.660756060 | 0.035018012 | 44.27062539 | 2.34620883 | 16398.46835 | 16359.48 | 0.49940 | 0.500959 | |

| Total Data | Data Cocok | Akurasi Akhir | Jumlah Iterasi |
|------------|------------|---------------|----------------|
| 98 | 82 | 83,67% | 5 kali |

Sheet 1 (Iterasi 1): Tahap awal (inisialisasi) menggunakan nilai acak. Akurasi masih rendah (**30,61%**).

Sheet 2 (Iterasi 2): Perbaikan pertama pusat kelompok. Akurasi mulai naik (**42,86%**).

Sheet 3 (Iterasi 3): Tahap penyesuaian posisi kelompok untuk mencari hasil paling stabil.

Sheet 4 (Iterasi 4): Optimasi besar-besaran, model mulai mengenali pola data. Akurasi melonjak (**75,51%**).

Sheet 5 (Iterasi 5): Hasil akhir (konvergen). Model mencapai akurasi tertinggi dan stabil (**83,67%**).

```

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import MinMaxScaler
from sklearn.decomposition import PCA
from sklearn.metrics import accuracy_score, classification_report
from itertools import permutations

class FuzzyCMeans:
    """Implementasi Algoritma Fuzzy C-Means (FCM)"""
    def __init__(self, n_clusters=3, m=2.0, max_iter=150, tol=1e-5):
        self.n_clusters = n_clusters # Jumlah kelompok
        self.m = m # Pangkat fuzziness (biasanya 2.0)
        self.max_iter = max_iter # Maksimal iterasi
        self.tol = tol # Batas toleransi konvergensi
        self.u = None # Membership matrix
        self.centers = None # Pusat klaster

    def fit(self, X):
        # Inisialisasi awal matriks keanggotaan (U) secara acak
        n_samples = X.shape[0]
        self.u = np.random.dirichlet(np.ones(self.n_clusters), size=n_samples)

        for i in range(self.max_iter):
            u_old = self.u.copy()

            # 1. Hitung Pusat Klaster (Centroids)
            um = self.u ** self.m
            self.centers = (um.T @ X) / um.sum(axis=0)[:, None]

            # 2. Update Matriks Keanggotaan (U)
            # Hitung jarak Euclidean data ke setiap pusat klaster
            dist = np.linalg.norm(X[:, None] - self.centers, axis=2)
            dist = np.maximum(dist, 1e-10) # Hindari pembagian nol

            inv_dist = 1.0 / dist
            power = 2.0 / (self.m - 1)
            prep = inv_dist ** power
            self.u = prep / prep.sum(axis=1)[:, None]

            # Cek konvergensi (apakah perubahan sudah sangat kecil?)
            if np.linalg.norm(self.u - u_old) < self.tol:
                print(f"Konvergensi tercapai pada iterasi ke-{i+1}")
                break
        return self

    def predict(self, X):
        # Menentukan klaster berdasarkan nilai keanggotaan tertinggi (Hard Clustering)
        return np.argmax(self.u, axis=1)

# --- PROGRAM UTAMA ---

```

```
# 1. Load Data
file_name = r'data_asli.csv'
df = pd.read_csv(file_name)

✓ 0.0s

# 2. Seleksi Fitur (Parameter polutan)
features = ['pm_10', 'pm_dua_koma_lima', 'so2', 'co', 'o3', 'no2']
X_data = df[features].values

✓ 0.0s

# 3. Preprocessing (Normalisasi agar rentang data seragam 0-1)
scaler = MinMaxScaler()
X_scaled = scaler.fit_transform(X_data)

✓ 0.0s

# 4. Training Model FCM
# Kita set n_clusters=3 sesuai kategori ISPU (Baik, Sedang, Tidak Sehat)
model_fcm = FuzzyCMeans(n_clusters=3, m=2.0)
model_fcm.fit(X_scaled)
df['cluster'] = model_fcm.predict(X_scaled)

✓ 0.0s
```

```
# 5. Evaluasi & Label Mapping
# Klaster 0, 1, 2 perlu dicocokkan dengan label 'BAIK', 'SEDANG', 'TIDAK SEHAT'
def map_clusters_to_labels(y_true, y_pred):
    unique_true = np.unique(y_true)
    unique_pred = np.unique(y_pred)
    best_acc = 0
    best_map = {}

    for p in permutations(unique_true):
        current_map = {unique_pred[i]: p[i] for i in range(len(unique_pred))}

        mapped_pred = [current_map[v] for v in y_pred]
        acc = accuracy_score(y_true, mapped_pred)
        if acc > best_acc:
            best_acc = acc
            best_map = current_map

    return best_map, best_acc

mapping, acc_score = map_clusters_to_labels(df['kategori'], df['cluster'])
df['prediksi_label'] = df['cluster'].map(mapping)

✓ 0.0s
```

```

# 6. Output Hasil
print("\n==== LAPORAN EVALUASI ===")
print(f"Akurasi Model: {acc_score * 100:.2f}%")
print("\nDetail Klasifikasi:")
print(classification_report(df['kategori'], df['prediksi_label']))
✓ 0.0s

==== LAPORAN EVALUASI ====
Akurasi Model: 57.53%

Detail Klasifikasi:
      precision    recall   f1-score   support
      BAIK        0.00      0.00      0.00       3
      SEDANG      0.97      0.51      0.67     225
TIDAK SEHAT      0.81      0.69      0.75     137

      accuracy          0.58      365
      macro avg        0.60      0.40      0.47      365
weighted avg      0.91      0.58      0.69      365

```

```

# 7. Simpan Hasil ke CSV
df.to_csv('Hasil_Clustering_FCM.csv', index=False)
print("Hasil telah disimpan ke 'Hasil_Clustering_FCM.csv'")
✓ 0.0s

Hasil telah disimpan ke 'Hasil_Clustering_FCM.csv'

```

```

# 8. Visualisasi dengan PCA (Reduksi Dimensi ke 2D)
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_scaled)

plt.figure(figsize=(12, 7))
sns.scatterplot(x=X_pca[:, 0], y=X_pca[:, 1], hue=df['prediksi_label'],
                 palette='viridis', s=100, alpha=0.7, edgecolor='w')
plt.title('Visualisasi Klastering ISPU menggunakan FCM (Proyeksi PCA)')
plt.xlabel('Komponen Utama 1')
plt.ylabel('Komponen Utama 2')
plt.grid(True, linestyle='--', alpha=0.5)
plt.legend(title='Kategori Prediksi')
plt.show()
✓ 0.4s

```

Visualisasi Klastering ISPU menggunakan FCM (Proyeksi PCA)

