

Dimension Reduction (High-D data visualization)

Input data:

1.52 12.88 3.43 1.40 73.28 0.69 8.04
1.52 12.98 3.54 1.21 73.00 0.65 8.53
1.52 14.21 3.82 0.47 71.77 0.11 9.57
1.52 13.21 3.77 0.79 71.99 0.13 10.25
1.52 13.39 3.66 1.19 72.79 0.57 8.27
1.52 13.41 3.55 1.25 72.81 0.68 8.10
1.52 12.71 3.33 1.49 73.28 0.67 8.24
1.53 13.80 3.15 0.66 70.57 0.08 11.64
1.52 13.46 3.83 1.26 72.55 0.57 8.21
1.52 12.93 3.66 1.56 72.51 0.58 8.55
1.52 13.53 3.41 1.52 72.04 0.58 8.79
1.52 13.33 3.53 1.34 72.67 0.56 8.34
1.52 13.14 3.45 1.76 72.48 0.60 8.38
1.52 14.03 3.76 0.58 71.79 0.11 9.65
1.52 13.04 3.40 1.26 73.01 0.52 8.58
1.52 14.01 2.68 3.50 69.89 1.68 5.87
1.51 13.02 0.00 3.04 70.48 6.21 6.96
1.52 12.97 0.33 1.51 73.39 0.13 11.27
1.52 11.03 1.71 1.56 73.44 0.58 11.62
1.51 13.00 0.00 3.02 70.70 6.21 6.93
1.52 14.56 0.00 0.56 73.48 0.00 11.22
1.51 17.38 0.00 0.34 75.41 0.00 6.65
1.52 13.79 2.41 1.19 72.76 0.00 9.77
1.52 14.46 2.24 1.62 72.38 0.00 9.26
1.52 14.09 2.19 1.66 72.67 0.00 9.33
1.52 11.95 0.00 1.19 75.18 2.70 8.93
1.52 14.36 0.00 2.02 73.42 0.00 8.44
1.51 13.69 3.20 1.81 72.81 1.76 5.43
1.52 13.87 0.00 2.54 73.23 0.14 9.41
1.52 14.37 0.00 2.74 72.85 0.00 9.45

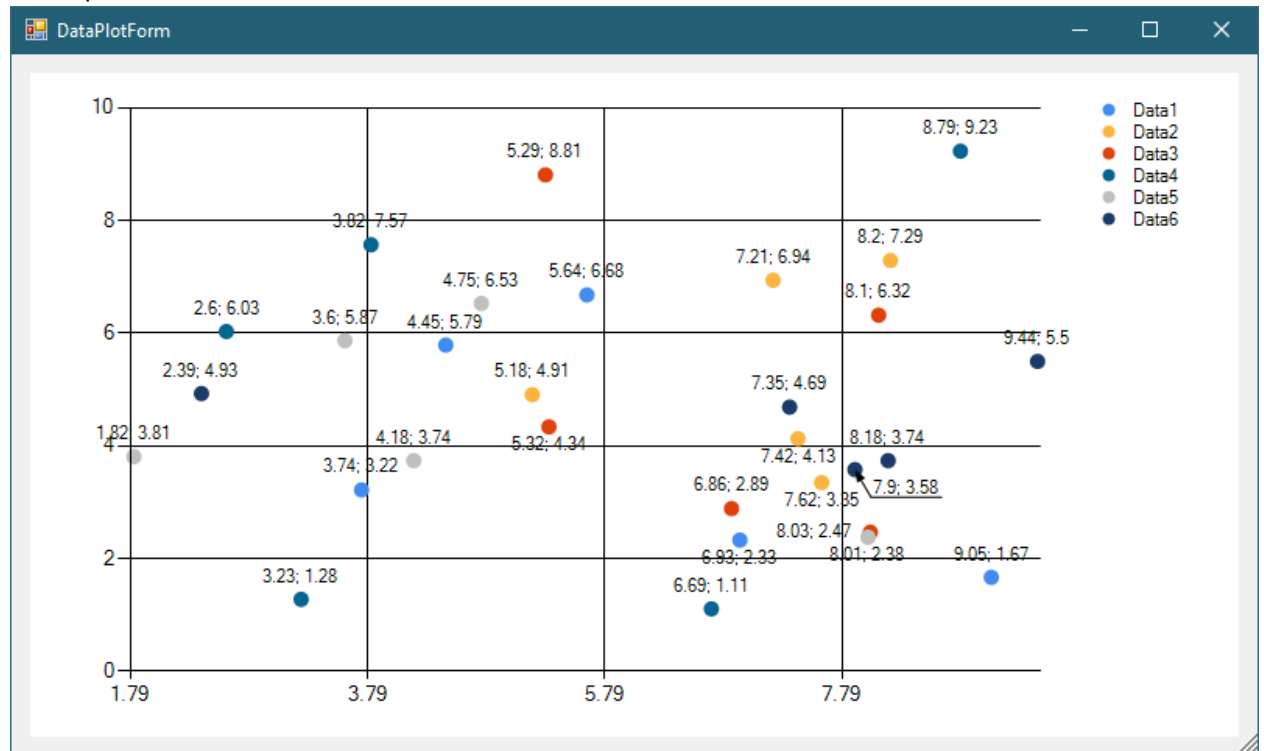
Distance matrix:

0.00 0.61 2.78 2.73 0.82 0.74 0.29 4.70 1.05 0.97 1.60 0.83 0.98 2.69 0.66 4.85 7.35 4.52 4.38 7.27 5.09 6.33 2.37 2.60 2.36 4.59 3.87 3.01 4.03 4.29
0.61 0.00 2.25 2.13 0.55 0.64 0.60 4.13 0.80 0.62 1.19 0.54 0.79 2.14 0.21 4.99 7.45 4.28 4.12 7.39 4.83 6.51 1.99 2.32 2.10 4.76 3.96 3.44 4.02 4.25
2.78 2.25 0.00 1.27 2.04 2.21 2.81 2.52 1.97 2.16 1.62 2.04 2.26 0.23 2.20 5.50 8.27 4.51 4.79 8.24 4.51 6.82 1.93 2.09 2.23 6.24 4.59 4.84 4.60 4.58
2.73 2.13 1.27 0.00 2.22 2.43 2.63 2.17 2.23 2.01 1.76 2.16 2.24 1.05 2.08 5.93 8.33 3.93 3.71 8.30 4.39 7.52 1.79 2.39 2.31 5.88 4.73 5.30 4.47 4.55
0.82 0.55 2.04 2.22 0.00 0.24 0.96 4.15 0.32 0.71 1.01 0.25 0.74 1.97 0.59 4.70 7.47 4.58 4.60 7.41 4.96 6.31 2.07 2.19 2.08 5.11 3.97 3.19 4.14 4.30
0.74 0.64 2.21 2.43 0.24 0.00 0.91 4.31 0.42 0.80 1.09 0.33 0.73 2.15 0.68 4.55 7.30 4.62 4.68 7.23 5.01 6.21 2.17 2.23 2.11 5.01 3.88 2.96 4.08 4.25
0.29 0.60 2.81 2.63 0.96 0.91 0.00 4.60 1.19 0.93 1.59 0.92 0.97 2.70 0.62 4.93 7.33 4.31 4.11 7.25 4.98 6.46 2.27 2.56 2.29 4.47 3.82 3.22 3.90 4.19
4.70 4.13 2.52 2.17 4.15 4.31 4.60 0.00 4.11 3.92 3.38 4.05 4.04 2.42 4.06 6.68 8.70 4.18 4.36 8.71 4.38 8.44 3.02 3.33 3.43 7.01 5.52 6.91 5.05 4.96
1.05 0.80 1.97 2.23 0.32 0.42 1.19 4.11 0.00 0.72 0.92 0.38 0.73 1.91 0.85 4.52 7.46 4.78 4.79 7.40 5.16 6.47 2.22 2.26 2.20 5.38 4.15 3.15 4.31 4.43
0.97 0.62 2.16 2.01 0.71 0.80 0.93 3.92 0.72 0.00 0.84 0.55 0.40 2.03 0.65 4.60 7.35 4.41 4.21 7.29 5.04 6.86 2.08 2.28 2.11 5.13 4.10 3.47 4.08 4.26
1.60 1.19 1.62 1.76 1.01 1.09 1.59 3.38 0.92 0.84 0.00 0.83 0.76 1.51 1.14 4.36 7.19 4.24 4.37 7.15 4.68 6.64 1.73 1.71 1.68 5.35 3.86 3.66 3.84 3.90
0.83 0.54 2.04 2.16 0.25 0.33 0.92 4.05 0.38 0.55 0.83 0.00 0.51 1.95 0.53 4.57 7.35 4.44 4.47 7.29 4.88 6.37 1.96 2.07 1.94 5.06 3.86 3.22 3.98 4.13
0.98 0.79 2.26 2.24 0.74 0.73 0.97 4.04 0.73 0.40 0.76 0.51 0.00 2.15 0.77 4.31 7.14 4.39 4.35 7.09 4.98 6.62 2.05 2.09 1.95 5.06 3.84 3.24 3.86 4.00
2.69 2.14 0.23 1.05 1.97 2.15 2.70 2.42 1.91 2.03 1.51 1.95 2.15 0.00 2.09 5.48 8.21 4.35 4.58 8.18 4.44 6.89 1.79 2.02 2.13 6.13 4.52 4.85 4.49 4.48
0.66 0.21 2.20 2.08 0.59 0.68 0.62 4.06 0.85 0.65 1.14 0.53 0.77 2.09 0.00 4.99 7.49 4.13 4.05 7.42 4.67 6.41 1.81 2.15 1.91 4.73 3.79 3.50 3.84 4.07
4.85 4.99 5.50 5.93 4.70 4.55 4.93 6.68 4.52 4.60 4.36 4.57 4.31 5.48 4.99 0.00 5.51 7.38 7.77 5.54 7.78 7.90 5.63 4.95 5.11 7.43 5.61 3.46 5.85 5.69
7.35 7.45 8.27 8.33 7.47 7.30 7.33 8.70 7.46 7.35 7.19 7.35 7.14 8.21 7.49 5.51 0.00 8.15 8.44 0.22 8.62 9.45 7.84 7.52 7.54 6.55 7.23 6.31 7.17 7.23
4.52 4.28 4.51 3.93 4.58 4.62 4.31 4.18 4.78 4.41 4.24 4.44 4.39 4.35 4.13 7.38 8.15 0.00 2.45 8.09 1.89 6.81 2.79 3.31 3.01 4.07 3.21 6.78 2.34 2.68
4.38 4.12 4.79 3.71 4.60 4.68 4.11 4.36 4.79 4.21 4.37 4.47 4.35 4.58 4.05 7.77 8.44 2.45 0.00 8.38 4.11 8.58 3.53 4.37 3.97 4.32 4.96 7.03 4.13 4.56
7.27 7.39 8.24 8.30 7.41 7.23 7.25 8.71 7.40 7.29 7.15 7.29 7.09 8.18 7.42 5.54 0.22 8.09 8.38 0.00 8.56 9.34 7.79 7.48 7.49 6.39 7.15 6.22 7.10 7.18
5.09 4.83 4.51 4.39 4.96 5.01 4.98 4.38 5.16 5.04 4.68 4.88 4.98 4.44 4.67 7.78 8.62 1.89 4.11 8.56 0.00 5.71 3.07 3.35 3.24 4.76 3.14 7.04 2.78 2.88
6.33 6.51 6.82 7.52 6.31 6.21 6.46 8.44 6.47 6.86 6.64 6.37 6.62 6.89 6.41 7.90 9.45 6.81 8.58 9.34 5.71 0.00 6.01 5.58 5.66 6.54 4.37 6.11 5.44 5.41
2.37 1.99 1.93 1.79 2.07 2.17 2.27 3.02 2.22 2.08 1.73 1.96 2.05 1.79 1.81 5.63 7.84 2.79 3.53 7.79 3.07 6.01 0.00 1.03 0.75 4.80 3.00 4.79 2.83 2.94
2.60 2.32 2.09 2.39 2.19 2.23 2.56 3.33 2.26 2.28 1.71 2.07 2.09 2.02 2.15 4.95 7.52 3.31 4.37 7.48 3.35 5.58 1.03 0.00 0.48 5.17 2.64 4.42 2.64 2.56
2.36 2.10 2.23 2.31 2.08 2.11 2.29 3.43 2.20 2.11 1.68 1.94 1.95 2.13 1.91 5.11 7.54 3.01 3.97 7.49 3.24 5.66 0.75 0.48 0.00 4.83 2.52 4.41 2.44 2.47
4.59 4.76 6.24 5.88 5.11 5.01 4.47 7.01 5.38 5.13 5.35 5.06 5.06 6.13 4.73 7.43 6.55 4.07 4.32 6.39 4.76 6.54 4.80 5.17 4.83 0.00 4.14 5.69 4.01 4.61
3.87 3.96 4.59 4.73 3.97 3.88 3.82 5.52 4.15 4.10 3.86 3.86 3.84 4.52 3.79 5.61 7.23 3.21 4.96 7.15 3.14 4.37 3.00 2.64 2.52 4.14 0.00 4.83 1.23 1.37
3.01 3.44 4.84 5.30 3.19 2.96 3.22 6.91 3.15 3.47 3.66 3.22 3.24 4.85 3.50 3.46 6.31 6.78 7.03 6.22 7.04 6.11 4.79 4.42 4.41 5.69 4.83 0.00 5.43 5.55
4.03 4.02 4.60 4.47 4.14 4.08 3.90 5.05 4.31 4.08 3.84 3.98 3.86 4.49 3.84 5.85 7.17 2.34 4.13 7.10 2.78 5.44 2.83 2.64 2.44 4.01 1.23 5.43 0.00 0.67
4.29 4.25 4.58 4.55 4.30 4.25 4.19 4.96 4.43 4.26 3.90 4.13 4.00 4.48 4.07 5.69 7.23 2.68 4.56 7.18 2.88 5.41 2.94 2.56 2.47 4.61 1.37 5.55 0.67 0.00

Generation 1:

Best chromosome:

2-D representation:

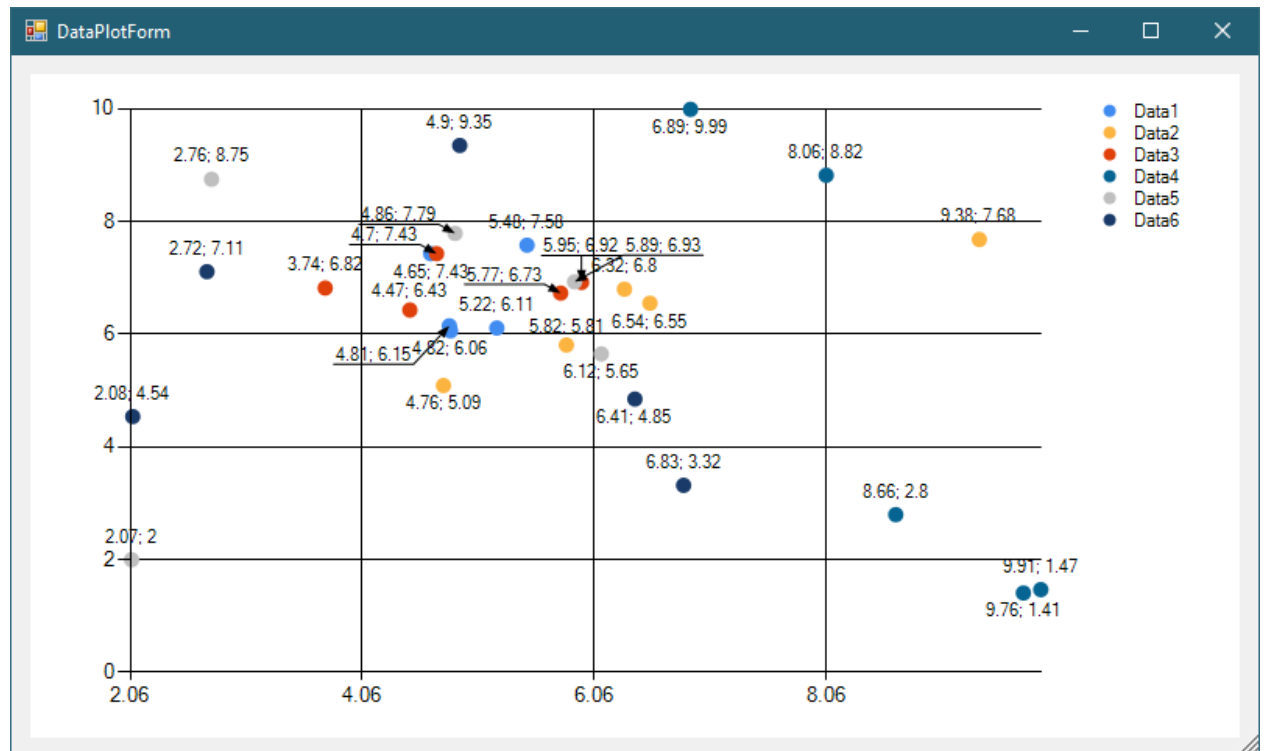


Genes:

(5.64, 6.68); (3.74, 3.22); (6.93, 2.33); (4.45, 5.79); (9.05, 1.67); (7.62, 3.35); (5.18, 4.91); (8.2, 7.29); (7.42, 4.13); (7.21, 6.94); (6.86, 2.89); (5.29, 8.81); (5.32, 4.34); (8.03, 2.47); (8.1, 6.32); (6.69, 1.11); (2.6, 6.03); (3.82, 7.57); (8.79, 9.23); (3.23, 1.28); (1.82, 3.81); (8.01, 2.38); (4.75, 6.53); (3.6, 5.87); (4.18, 3.74); (7.35, 4.69); (9.44, 5.5); (8.18, 3.74); (2.39, 4.93); (7.9, 3.58)

Fitness function = 2790.217013255

2-D representation:



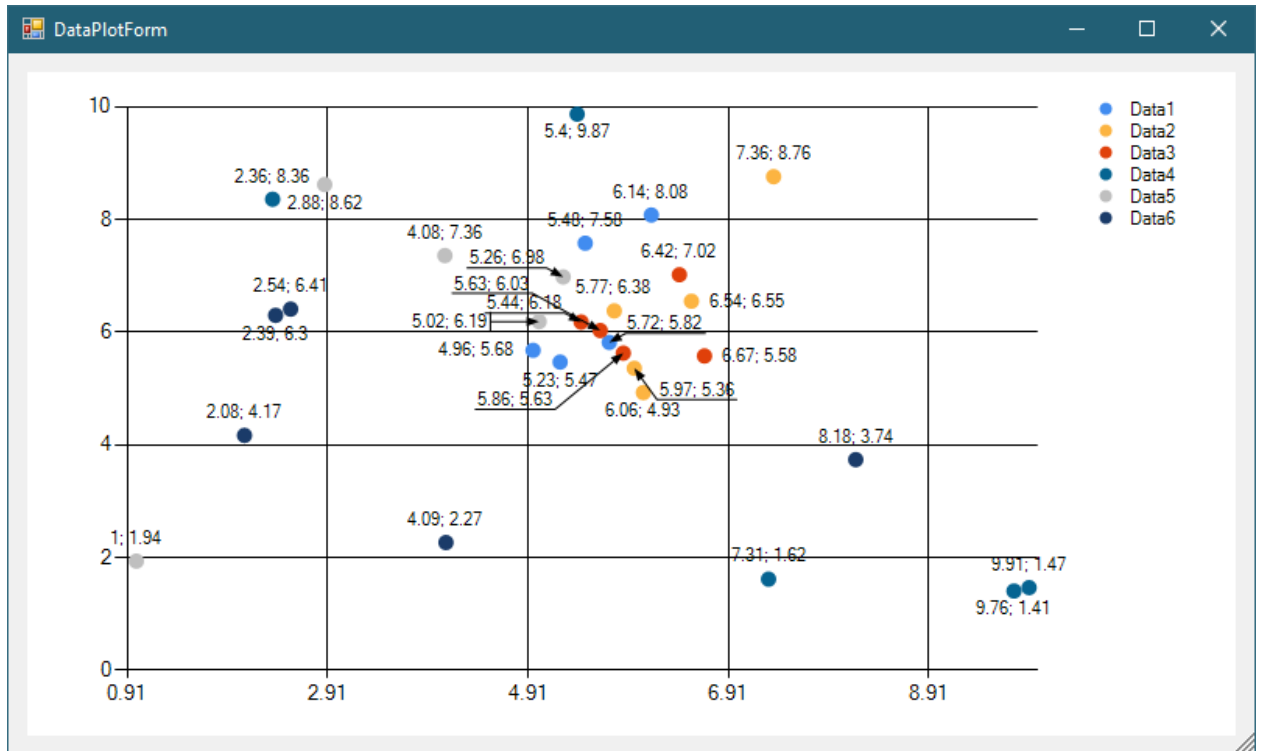
(4.65, 7.43); (5.22, 6.11); (5.48, 7.58); (4.82, 6.06); (4.81, 6.15); (4.76, 5.09); (6.32, 6.8); (9.38, 7.68); (5.82, 5.81); (6.54, 6.55); (4.47, 6.43); (4.7, 7.43); (5.77, 6.73); (5.95, 6.92); (3.74, 6.82); (8.66, 2.8); (9.91, 1.47); (8.06, 8.82); (6.89, 9.99); (9.76, 1.41); (2.76, 8.75); (2.07, 2); (6.12, 5.65); (4.86, 7.79); (5.89, 6.93); (2.08, 4.54); (6.41, 4.85); (6.83, 3.32); (4.9, 9.35); (2.72, 7.11)

Fitness function = 779.213344159343

Generation 50:

Best chromosome:

2-D representation:



Genes:

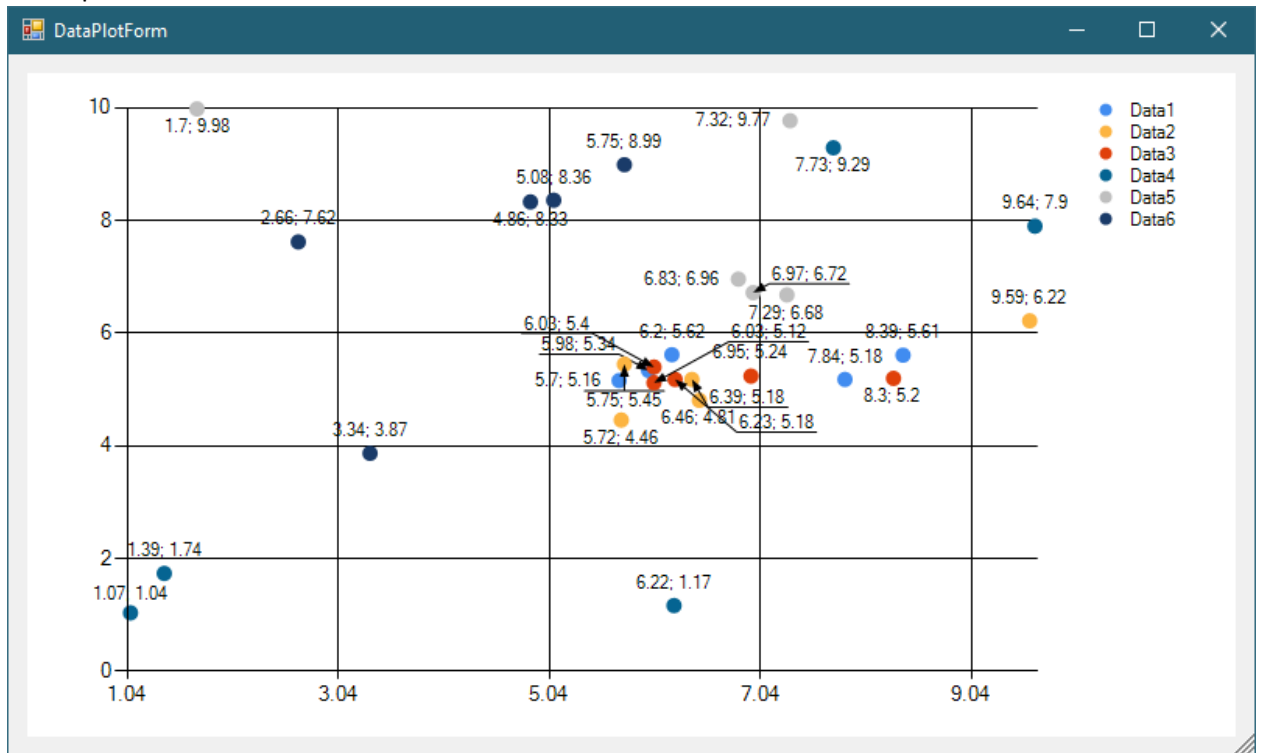
(4.96, 5.68); (5.23, 5.47); (5.48, 7.58); (6.14, 8.08); (5.72, 5.82); (5.77, 6.38); (6.06, 4.93); (7.36, 8.76); (5.97, 5.36); (6.54, 6.55); (5.44, 6.18); (6.67, 5.58); (5.63, 6.03); (6.42, 7.02); (5.86, 5.63); (7.31, 1.62); (9.91, 1.47); (2.36, 8.36); (5.4, 9.87); (9.76, 1.41); (2.88, 8.62); (1, 1.94); (4.08, 7.36); (5.02, 6.19); (5.26, 6.98); (4.09, 2.27); (2.08, 4.17); (8.18, 3.74); (2.54, 6.41); (2.39, 6.3)

Fitness function = 400.58571189106

Result:

Best chromosome:

2-D representation:



Fitness function:

