# generation1:

## methods:

normalrange=[-1 1];

fitlm

## result:

### Linear regression model:

y ~ [Linear formula with 36 terms in 7 predictors]

Estimated Coefficients:

Estimate SE tStat pValue

\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

(Intercept) -10.302 9.0254 -1.1415 0.37192

x1 -4.1763 3.1786 -1.3139 0.31935

x2 1.6662 6.0632 0.27481 0.80925

x3 -8.4932 5.3004 -1.6024 0.25025

x4 -4.6138 8.9858 -0.51346 0.65873

x5 -4.5457 3.7202 -1.2219 0.34621

x6 -9.2771 6.7716 -1.37 0.30421

x7 -3.5121 6.3382 -0.55411 0.63519

x1:x2 -6.3922 13.44 -0.47561 0.68124

x1:x3 5.1365 7.0467 0.72893 0.54185

x1:x4 3.4264 4.1815 0.8194 0.49867

x1:x5 7.6067 6.6693 1.1406 0.37223

x1:x6 0 0 NaN NaN

x1:x7 -5.9135 8.0061 -0.73862 0.53705

x2:x3 0 0 NaN NaN

x2:x4 0 0 NaN NaN

x2:x5 1.3697 6.8599 0.19966 0.8602

x2:x6 3.9987 7.2931 0.54829 0.63852

x2:x7 9.2107 5.4341 1.695 0.23217

x3:x4 -0.099084 4.3887 -0.022577 0.98404

x3:x5 -5.2925 4.0435 -1.3089 0.32075

x3:x6 -1.4406 4.3791 -0.32898 0.77343

x3:x7 4.2482 5.6022 0.7583 0.52745

x4:x5 -2.9441 4.8507 -0.60695 0.60561

x4:x6 -1.8246 3.615 -0.50474 0.66386

x4:x7 3.7183 6.5367 0.56884 0.62683

x5:x6 2.4952 6.876 0.36288 0.75146

x5:x7 0 0 NaN NaN

x6:x7 -0.030111 6.5757 -0.0045792 0.99676

x1^2 6.192 7.2911 0.84925 0.48518

x2^2 0 0 NaN NaN

x3^2 -4.985 16.41 -0.30378 0.78999

x4^2 15.394 18.89 0.81491 0.50073

x5^2 0 0 NaN NaN

x6^2 21.016 9.5381 2.2034 0.15843

x7^2 0 0 NaN NaN

Number of observations: 38, Error degrees of freedom: 9

Root Mean Squared Error: 10.1

R-squared: 0.938, Adjusted R-Squared 0.747

F-statistic vs. constant model: 4.9, p-value = 0.00845

### Optimal：

Optimal\_x=

0.4504 0.0000 2.0000 0.1234 0.1600 2.6033 0.1640

optimal\_y =

-51.0353

# generation1:

## methods:

normalrange=[-1 1];

fitlm

## result:

Linear regression model:

y ~ 1 + x1\*x2 + x1\*x3 + x1\*x4 + x2\*x3 + x2\*x4 + x3\*x4 + x1^2 + x2^2 + x3^2 + x4^2

Estimated Coefficients:

Estimate SE tStat pValue

\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

(Intercept) -5.1749 3.8136 -1.357 0.18796

x1 -7.3428 1.6715 -4.3929 0.00021147

x2 -7.9095 1.6658 -4.7481 8.7229e-05

x3 -10.719 1.6439 -6.5207 1.1828e-06

x4 -9.0219 1.6582 -5.4409 1.5732e-05

x1:x2 2.6632 1.8853 1.4126 0.17117

x1:x3 3.8235 1.8679 2.047 0.052251

x1:x4 3.9827 1.9087 2.0866 0.048207

x2:x3 3.4516 1.9483 1.7716 0.089712

x2:x4 2.5877 1.9782 1.3081 0.20376

x3:x4 4.9966 1.9541 2.5569 0.017625

x1^2 6.8134 3.9959 1.7051 0.10165

x2^2 11.469 3.998 2.8687 0.0086796

x3^2 7.5683 3.763 2.0112 0.056162

x4^2 3.6553 3.7754 0.96819 0.34302

Number of observations: 38, Error degrees of freedom: 23

Root Mean Squared Error: 8.18

R-squared: 0.873, Adjusted R-Squared 0.796

F-statistic vs. constant model: 11.3, p-value = 3.54e-07

### Optimal：

Optimal\_x=

2.5497 0.4714 1.3479 3.6931

optimal\_y =

-12.1476