# Q1:

Figures are saved in M0 and M1 pdf for Deathevent = 0 and 1 respectively

## For surviving patient:

Highest correlation:

Between smoking and sex: 0.49

Lowest correlation:

Between time and serum\_creatinine: 8.6\*10^-5

## For deceased patiend:

Highest correlation:

Between sex and smoke: 0.36

Lowest correlation:

Between diabetes and serum\_sodium: -0.0085

The highest correlation features (smoking and sex) is the same fore both the datasets, but not the lowest correlation features.

# Q2:

(See the output of the python script. Q2.ipynb)

For DeathEvent = 0

Group 1:

Degree: 1

Weights: [-1.08103087e+01 2.62977657e+05]

sse 1229300764100.7097

A blue dots on a white background

Description automatically generated

Degree: 2

Weights: [ 7.36147931e-04 -1.36701891e+01 2.63859520e+05]

sse 1230979413211.6606

A blue dots on a white background

Description automatically generated

Degree: 3

Weights: [ 5.59878569e-06 -3.68628533e-02 3.95971533e+01 2.53545298e+05]

sse 1264089991105.497

A blue dots on a white background

Description automatically generated

y=a\*log(x)+b:

Weights: [ -1371.51221876 264524.08933887]

sse 1214660052361.115

A screen shot of a graph

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [-0.01924196 12.5006629 ]

sse 1308780862847.3835

A screen shot of a computer generated image

Description automatically generated

Group 2:

Degree: 1

Weights: [-3.46777226e-06 1.37958916e+02]

sse 1457.5562434847518

A green line with blue dots

Description automatically generated

Degree: 2

Weights: [ 1.14160238e-11 -9.81521664e-06 1.38754546e+02]

sse 1396.7657297709256

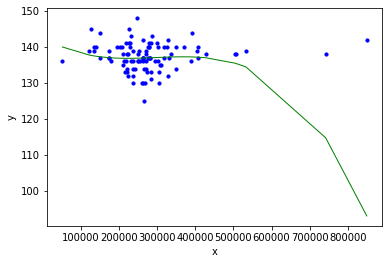
A green line with blue dots

Description automatically generated

Degree: 3

Weights: [-2.72841809e-16 2.42175598e-10 -6.73256853e-05 1.42862230e+02]

sse 4348.7641568882



y=a\*log(x)+b:

Weights: [ -0.92298529 148.50565586]

sse 1435.7154281856353

A green line with blue dots

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [-0.00679369 5.00417793]

sse 1441.1962450234082

A green line with blue dots

Description automatically generated

Group 3:

Degree: 1

Weights: [-0.04795324 7.73994424]

sse 46.84695297838756

A graph with blue dots

Description automatically generated

Degree: 2

Weights: [ 1.51405551e-04 -8.82859808e-02 1.04210667e+01]

sse 46.69415022849149

A graph with blue dots

Description automatically generated

Degree: 3

Weights: [ 4.83785030e-04 -1.89275275e-01 2.45411870e+01 -1.05254812e+03]

sse 47.62965550204059

A graph of a graph

Description automatically generated with medium confidence

y=a\*log(x)+b:

Weights: [-6.35171352 32.41745728]

sse 46.6582111370375

A graph with blue dots

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [-3.40090664 16.81967047]

sse 46.731678429591646

A graph with blue dots

Description automatically generated

Group 4:

Degree: 1

Weights: [1.92481524e-09 1.16656466e+00]

sse 46.19382340717747

A blue dots on a white background

Description automatically generated

Degree: 2

Weights: [-5.18853551e-12 2.88681197e-06 8.04953969e-01]

sse 51.51795336264112

A green line with blue dots

Description automatically generated

Degree: 3

Weights: [ 1.86058866e-17 -2.09247106e-11 6.80862022e-06 5.24838904e-01]

sse 49.928277416106916

A green line with blue dots

Description automatically generated

y=a\*log(x)+b:

Weights: [0.04959357 0.55252782]

sse 46.489845461209924

A blue dots on a white background

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [ 0.04135083 -0.42516542]

sse 47.52997649492427

A blue dots on a white background

Description automatically generated

For DeathEvent = 1

Group 1:

Degree: 1

Weights: [2.35040785e+00 2.58591857e+05]

sse 413831572018.0591

A green line with blue dots

Description automatically generated

Degree: 2

Weights: [-4.75022726e-03 3.60646354e+01 2.47242072e+05]

sse 450366611264.84424

A green line with blue dots

Description automatically generated

Degree: 3

Weights: [ 1.44015366e-06 -1.93001011e-02 6.53826996e+01 2.40093608e+05]

sse 456278764712.7812

A green line with blue dots

Description automatically generated

y=a\*log(x)+b:

Weights: [ 12816.60806992 187110.50070014]

sse 437152238324.48254

A green line with blue dots

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [ 0.06770817 12.00319607]

sse 448000928105.9662

A green line with blue dots

Description automatically generated

Group 2:

Degree: 1

Weights: [1.52961443e-05 1.31125005e+02]

sse 914.3214612080378

A green line with blue dots

Description automatically generated

Degree: 2

Weights: [-4.09025151e-11 4.05702415e-05 1.27749855e+02]

sse 967.3467195346843

A green line with blue dots

Description automatically generated

Degree: 3

Weights: [ 9.80564143e-17 -1.39237132e-10 6.90920756e-05 1.25387680e+02]

sse 975.2680780325386

A green line with blue dots

Description automatically generated

y=a\*log(x)+b:

Weights: [ 4.22050132 82.81634447]

sse 979.6050969494561

A green line with blue dots

Description automatically generated

log(y) = a\*log(x)+b:

Weights: [0.03146629 4.51526824]

sse 987.1283689572031

A green line with blue dots

Description automatically generated

Group 3:

Degree: 1

Weights: [-0.03965682 6.90550997]

sse 190.86902075172125

A graph of a graph with blue dots

Description automatically generated with medium confidence

Degree: 2

Weights: [ 1.30162486e-03 -3.85054853e-01 2.97679791e+01]

sse 191.14929488646266

A graph of a graph with blue dots

Description automatically generated with medium confidence

Degree: 3

Weights: [ 1.11952321e-04 -4.29737215e-02 5.43636732e+00 -2.24667920e+02]

sse 189.87607304099234

A graph of a graph with blue dots

Description automatically generated with medium confidence

y=a\*log(x)+b:

Weights: [-5.30177018 27.55344461]

sse 190.92815653264992

A graph of a graph with blue dots

Description automatically generated with medium confidence

log(y) = a\*log(x)+b:

Weights: [-2.94869777 14.81085845]

sse 198.30632941543314

A graph of a graph with blue dots

Description automatically generated with medium confidence

Group 4:

Degree: 1

Weights: [-1.64149833e-06 1.97473011e+00]

sse 191.39203216555052

A graph of dots and lines

Description automatically generated with medium confidence

Degree: 2

Weights: [ 8.01216602e-12 -6.59230056e-06 2.63586945e+00]

sse 193.8460477131847

A graph of dots and lines

Description automatically generated with medium confidence

Degree: 3

Weights: [-1.07665972e-17 1.88093099e-11 -9.72399880e-06 2.89523643e+00]

sse 193.82384775938243

A graph of dots and lines

Description automatically generated with medium confidence

y=a\*log(x)+b:

Weights: [-0.49982307 7.74002009]

sse 193.363384131219

A graph of a graph of dots

Description automatically generated with medium confidence

log(y) = a\*log(x)+b:

Weights: [-0.24586778 3.39324573]

sse 199.46549553443958

A graph of a graph of a line

Description automatically generated with medium confidence

# Q3:

Group 1:

|  |  |  |
| --- | --- | --- |
| Model | SSE (death\_event=0) | SSE (death\_event=1) |
| y = ax + b | 1229300764100.7097 | 413831572018.0591 |
| y = ax^2 + bx + c | 1230979413211.6606 | 450366611264.84424 |
| y = ax^3 + bx^2 + cx + d | 1264089991105.497 | 456278764712.7812 |
| y = a log x + b | 1214660052361.115 | 437152238324.48254 |
| log y = a log x + b | 1308780862847.3835 | 448000928105.9662 |

1. Best Model for surviving patient:

y = a log x + b

1. Best Model for deceased patient:

y = ax + b

1. Worst Model for surviving patient:

log y = a log x + b

1. Worst Model for deceased patient:

y = ax^3 + bx^2 + cx + d

Group 2:

|  |  |  |
| --- | --- | --- |
| Model | SSE (death\_event=0) | SSE (death\_event=1) |
| y = ax + b | 1457.5562434847518 | 914.3214612080378 |
| y = ax^2 + bx + c | 1396.7657297709256 | 967.3467195346843 |
| y = ax^3 + bx^2 + cx + d | 4348.7641568882 | 975.2680780325386 |
| y = a log x + b | 1435.7154281856353 | 979.6050969494561 |
| log y = a log x + b | 1441.1962450234082 | 987.1283689572031 |

1. Best Model for surviving patient:

y = ax^2 + bx + c

1. Best Model for deceased patient:

y = ax + b

1. Worst Model for surviving patient:

y = ax^3 + bx^2 + cx + d

1. Worst Model for deceased patient:

log y = a log x + b

Group 3:

|  |  |  |
| --- | --- | --- |
| Model | SSE (death\_event=0) | SSE (death\_event=1) |
| y = ax + b | 46.84695297838756 | 190.86902075172125 |
| y = ax^2 + bx + c | 46.69415022849149 | 191.14929488646266 |
| y = ax^3 + bx^2 + cx + d | 47.62965550204059 | 189.87607304099234 |
| y = a log x + b | 46.6582111370375 | 190.92815653264992 |
| log y = a log x + b | 46.731678429591646 | 198.30632941543314 |

1. Best Model for surviving patient:

y = a log x + b

1. Best Model for deceased patient:

y = ax^3 + bx^2 + cx + d

1. Worst Model for surviving patient:

y = ax^3 + bx^2 + cx + d

1. Worst Model for deceased patient:

log y = a log x + b

Group 4:

|  |  |  |
| --- | --- | --- |
| Model | SSE (death\_event=0) | SSE (death\_event=1) |
| y = ax + b | 46.19382340717747 | 191.39203216555052 |
| y = ax^2 + bx + c | 51.51795336264112 | 193.8460477131847 |
| y = ax^3 + bx^2 + cx + d | 49.928277416106916 | 193.82384775938243 |
| y = a log x + b | 46.489845461209924 | 193.363384131219 |
| log y = a log x + b | 47.52997649492427 | 199.46549553443958 |

1. Best Model for surviving patient:

y = ax + b

1. Best Model for deceased patient:

y = ax + b

1. Worst Model for surviving patient:

y = ax^2 + bx + c

1. Worst Model for deceased patient:

log y = a log x + b