**Practical work assignments 7**

In this work, each student will have to complete two tasks according to their variant number. The variant number corresponds to the student's number in the journal.

**Task 1**

A table is set containing the true value of the target feature Y and the predicted value Y'.

Find the values of MAE and MAPE.

**Variants:**

1.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -3 | -4 |

2.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 1 |
| C | ……………………… | 3 | 1 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | 3 | 4 |

3.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | -2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 2 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | 12 | 1 |
| H | ……………………… | 13 | 14 |

4.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | 7 | 6 |
| H | ……………………… | 6 | 7 |

5.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 0 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | 8 | 4 |
| H | ……………………… | -3 | -4 |

6.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 0 | 1 |
| G | ……………………… | -1 | -1 |
| H | ……………………… | -5 | -4 |

7.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 0 | 0 |
| B | ……………………… | 2 | 3 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 2 |
| G | ……………………… | -2 | 0 |
| H | ……………………… | -3 | -3 |

8.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 0 | 1 |
| G | ……………………… | -1 | -1 |
| H | ……………………… | -3 | -5 |

9.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 3 |
| B | ……………………… | 2 | 5 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 7 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 0 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -5 | -4 |

10.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 0 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | 0 | -4 |

11.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | 0 |
| H | ……………………… | -6 | -4 |

12.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 0 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -7 | -9 |

13.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 6 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -6 | -4 |

14.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -10 | -6 |
| G | ……………………… | -2 | 2 |
| H | ……………………… | -4 | -4 |

15.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 4 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 0 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -5 | -9 |

16.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 0 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 0 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -8 | -10 |

17.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 1 |
| B | ……………………… | 2 | -2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 6 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -3 | -4 |

18.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 0 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -4 | -7 |

19.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | -1 |
| B | ……………………… | 2 | 0 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 6 | 10 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -3 | -4 |

20.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 6 | 1 |
| G | ……………………… | 7 | 5 |
| H | ……………………… | -3 | -4 |

21.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | -2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 0 | -1 |
| G | ……………………… | -3 | -1 |
| H | ……………………… | -9 | -10 |

22.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | -2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | -1 |
| G | ……………………… | -2 | 1 |
| H | ……………………… | -6 | -8 |

23.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 4 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | 1 |
| H | ……………………… | -13 | -14 |

24.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 1 |
| B | ……………………… | 2 | 0 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 4 |
| F | ……………………… | -1 | -1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -4 | -4 |

25.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | -1 |
| B | ……………………… | 2 | 0 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 4 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -3 | -3 |

26.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | -1 |
| G | ……………………… | -2 | -2 |
| H | ……………………… | -3 | -3 |

27.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 0 |
| B | ……………………… | 2 | 5 |
| C | ……………………… | 3 | 3 |
| D | ……………………… | 4 | 4 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | -1 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -7 | -5 |

28.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 0 | 0 |
| B | ……………………… | 1 | 2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 3 |
| F | ……………………… | 2 | 1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -3 | -4 |

29.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | 1 |
| B | ……………………… | 2 | -2 |
| C | ……………………… | 3 | 2 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 6 |
| F | ……………………… | -1 | -1 |
| G | ……………………… | -2 | -1 |
| H | ……………………… | -6 | -4 |

30.

|  |  |  |  |
| --- | --- | --- | --- |
| Objects | Non-target attributes | У | У’ |
| A | ……………………… | 1 | -1 |
| B | ……………………… | 2 | 2 |
| C | ……………………… | 3 | 6 |
| D | ……………………… | 4 | 5 |
| E | ……………………… | 5 | 4 |
| F | ……………………… | -1 | 0 |
| G | ……………………… | -2 | -2 |
| H | ……………………… | -5 | -5 |

# **Task 2**

# The objects in the following tables have two non-target attributes X1, X2 and one target attribute Y.

# Build a linear and polynomial regression model.

# **Variants:**

# 1.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 3 | 7 | 10 |
| 6 | 9 | 15 |
| 8 | 12 | 20 |
| 11 | 14 | 25 |
| 13 | 17 | 30 |

# 2.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0 | 2 | 4 |
| 1 | 3 | 5 |
| 2 | 4 | 6 |
| 3 | 5 | 7 |
| 4 | 6 | 8 |

# 3.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 50 | 60 | 110 |
| 55 | 66 | 120 |
| 70 | 78 | 150 |
| 75 | 85 | 160 |
| 90 | 100 | 200 |

# 4.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 200 | 260 | 480 |
| 210 | 310 | 520 |
| 220 | 330 | 540 |
| 230 | 350 | 560 |
| 240 | 390 | 590 |

# 5.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 1.5 | 2.5 | 3.0 |
| 2.0 | 3.1 | 5.0 |
| 2.5 | 3.6 | 6.0 |
| 3.0 | 4.2 | 7.0 |
| 3.5 | 5 | 9.0 |

# 6.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0.01 | 0.03 | 0.1 |
| 0.04 | 0.05 | 0.12 |
| 0.07 | 0.06 | 0.15 |
| 0.10 | 0.11 | 0.21 |
| 0.13 | 0.18 | 0.3 |

# 7.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 3 | 5 | 11 |
| 6 | 9 | 15 |
| 8 | 12 | 20 |
| 9 | 13 | 25 |
| 10 | 16 | 32 |

# 8.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0 | 2,5 | 3 |
| 1 | 3,2 | 5 |
| 2 | 4,6 | 6 |
| 3 | 5,4 | 7 |
| 4 | 6,3 | 9 |

# 9.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 50 | 62 | 100 |
| 55 | 66 | 120 |
| 70 | 79 | 150 |
| 75 | 86 | 160 |
| 90 | 110 | 180 |

# 10.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 200 | 270 | 500 |
| 210 | 320 | 520 |
| 220 | 333 | 540 |
| 230 | 355 | 560 |
| 240 | 380 | 560 |

# 11.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 1.5 | 2.4 | 4.0 |
| 2.0 | 3.1 | 5.0 |
| 2.5 | 3.2 | 7.0 |
| 3.0 | 4.3 | 8.0 |
| 3.5 | 5,1 | 9.0 |

# 12.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0.02 | 0.03 | 0.03 |
| 0.03 | 0.05 | 0.05 |
| 0.07 | 0.09 | 0.16 |
| 0.09 | 0.11 | 0.2 |
| 0.12 | 0.18 | 0.26 |

# 13.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 5 | 7,1 | 10 |
| 6 | 9,2 | 15 |
| 8 | 12 | 20 |
| 11 | 14 | 25 |
| 12 | 16 | 33 |

# 14.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0 | 2 | 3 |
| 1 | 3 | 5 |
| 2 | 4 | 6 |
| 3 | 5 | 8 |
| 4 | 6 | 9 |

# 15.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 50 | 62 | 112 |
| 55 | 66 | 120 |
| 70 | 76 | 150 |
| 75 | 88 | 160 |
| 90 | 100 | 170 |

# 16.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 200 | 270 | 500 |
| 210 | 310 | 520 |
| 220 | 330 | 540 |
| 230 | 350 | 570 |
| 240 | 400 | 600 |

# 17.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 1.5 | 2.5 | 4.0 |
| 2.0 | 3.0 | 5.0 |
| 2.5 | 3.6 | 6.0 |
| 3.0 | 4.3 | 7.5 |
| 3.5 | 5 | 9.0 |

# 18.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0.11 | 0.1 | 0.13 |
| 0.14 | 0.2 | 0.17 |
| 0.17 | 0.3 | 0.19 |
| 0.2 | 0.4 | 0.22 |
| 0.23 | 0.48 | 0.26 |

# 19.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 3 | 7 | 10 |
| 6 | 9 | 15 |
| 9 | 12 | 20 |
| 12 | 14 | 25 |
| 15 | 17 | 30 |

# 20.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0 | 3 | 4 |
| 1 | 4 | 5,7 |
| 2 | 4,5 | 6,3 |
| 3 | 5 | 7 |
| 4 | 6 | 8,2 |

# 21.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 50 | 60 | 100 |
| 65 | 70 | 120 |
| 70 | 80 | 150 |
| 80 | 90 | 160 |
| 90 | 100 | 210 |

# 22.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 210 | 260 | 500 |
| 220 | 310 | 520 |
| 230 | 330 | 540 |
| 240 | 350 | 560 |
| 250 | 390 | 580 |

# 23.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 1.5 | 2.5 | 3.0 |
| 2.0 | 3.1 | 5.0 |
| 2.5 | 3.6 | 6.0 |
| 3.0 | 4.2 | 7.0 |
| 3.6 | 5.5 | 9.0 |

# 24.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0.01 | 0.03 | 0.12 |
| 0.04 | 0.05 | 0.19 |
| 0.07 | 0.06 | 0.25 |
| 0.10 | 0.11 | 0.31 |
| 0.13 | 0.18 | 0.37 |

# 25.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 3 | 7 | 10 |
| 6 | 9 | 15 |
| 8 | 12 | 20 |
| 11 | 14 | 25 |
| 14 | 16 | 30 |

# 26.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0 | 2 | 4 |
| 1 | 3 | 5 |
| 2 | 4 | 6,2 |
| 3 | 4,5 | 7,4 |
| 4 | 6.1 | 8,6 |

# 27.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 50 | 70 | 110 |
| 55 | 66 | 120 |
| 60 | 78 | 150 |
| 65 | 85 | 180 |
| 80 | 120 | 195 |

# 28.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 200 | 260 | 250 |
| 210 | 310 | 320 |
| 220 | 330 | 400 |
| 230 | 350 | 500 |
| 240 | 390 | 600 |

# 29.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 1.5 | 2.3 | 4.0 |
| 2.0 | 3.1 | 5.0 |
| 2.5 | 3.6 | 6.0 |
| 3.0 | 4.2 | 7.0 |
| 3.5 | 5.4 | 9.0 |

# 30.

|  |  |  |
| --- | --- | --- |
| **x1** | **x2** | **y** |
| 0.01 | 0.03 | 0.3 |
| 0.04 | 0.05 | 0.49 |
| 0.07 | 0.06 | 0.55 |
| 0.10 | 0.11 | 0.61 |
| 0.13 | 0.19 | 0.77 |