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LAMPIRAN

Lampiran 1. Data

Kabupaten/Kota	y_1	y_2	x_1	x_2	x_3	x_4	x_5
Kepulauan Selayar	12.24	68.35	68.81	76.21	69.93	3.67	45.38
Bulukumba	7.39	70.34	68.51	82.85	65.27	3.81	41.75
Bantaeng	9.07	69.69	70.88	74.22	75.36	15.45	40.27
Jeneponto	13.73	65.13	66.81	70.89	75.26	3.81	43.14
Takalar	8.25	68.31	67.64	77	64.46	4.64	45.35
Gowa	7.36	70.99	70.7	79.1	73.16	4.59	43.92
Sinjai	8.8	68.33	67.68	80.84	63.34	4.87	44.55
Maros	9.43	71	69.28	80.45	61.37	9.13	45.37
Pangkajene dan Kepulauan	13.92	69.79	67.12	74.64	74.66	4.93	46.79
Barru	8.4	71.53	69.35	81.48	62.36	5.11	47.94
Bone	10.58	67.01	67.57	75.63	67.48	5.23	45.26
Soppeng	7.49	69.7	70.2	82.28	61.9	6.18	44.98
Wajo	6.57	70.26	67.82	73.13	61.13	2.38	43.66
Sindereng Rappang	5.11	72.06	70.41	77.99	57.63	4.86	46.72
Pinrang	8.79	71.97	70.15	77.94	57.72	4.52	46.25
Enrekang	12.39	73.39	71.17	83.45	72.05	3.71	47.77
Luwu	12.49	71.36	70.75	79.38	67.74	5.69	47.35
Tana Toraja	12.18	69.88	73.72	78.28	85.11	5.12	44.62
Luwu Utara	13.22	70.51	69.03	76.3	72.23	4.54	44.21
Luwu Timur	6.81	73.92	70.94	80.35	71.51	1.99	48.17
Toraja Utara	11.65	70.36	73.65	83.76	68.84	5.27	54.43
Makassar	4.58	83.12	72.4	80.77	59.27	5.40	42.94
Parepare	5.41	78.54	71.57	79.57	63.62	5.93	45.13
Palopo	7.78	78.91	71.18	82.62	63.65	5.83	44.32

Lampiran 2. Hasil Model Terbaik MARS Respon Persentase Penduduk Miskin

```
LEARNING SAMPLE STATISTICS
 ==========================

 VARIABLE              MEAN          SD           N         SUM
 ----------------------------------------------------------------
       Y1            9.3183      2.8304     24.0000    223.6400
       X1           69.8892      1.9381     24.0000   1677.3400
       X2           78.7138      3.4353     24.0000   1889.1300
       X3           67.2938      6.7226     24.0000   1615.0500
       X4            5.2775      2.5633     24.0000    126.6600
       X5           45.4279      2.7160     24.0000   1090.2700


 Ordinal Response
                      min         Q25         Q50         Q75         max
 ----------------------------------------------------------------------------
       Y1            4.5800      7.3600      8.7900     12.1800     13.9200

 Ordinal Predictor Variables: 5
                      min         Q25         Q50         Q75         max
 ----------------------------------------------------------------------------
       X1           66.8100     67.8200     70.1500     70.9400     73.7200
       X2           70.8900     76.2100     79.1000     80.8400     83.7600
       X3           57.6300     61.9000     65.2700     72.0500     85.1100
       X4            1.9900      3.8100      4.8700      5.4000     15.4500
       X5           40.2700     43.9200     45.1300     46.7200     54.4300


 Forward Stepwise Knot Placement
 ===============================

 BasFn(s)      GCV  IndBsFns EfPrms Variable            Knot       Parent  BsF
 -----------------------------------------------------------------------------
     0         8.3597    0.0    1.0
     1         6.3293    1.0    4.0       X3          57.6300
   3   2       7.9329    3.0    8.0       X4           3.6700
   5   4      10.9009    5.0   12.0       X2          82.8500
     6        15.3779    6.0   15.0       X1          66.8100
     7        26.6806    7.0   18.0       X5          40.2700
   9   8      94.9532    8.0   21.0       X1          69.0300

 Model 1 of 8

 Estimated optimal model = response mean.
 Model 2 of 8

 Estimated optimal model = response mean.
 Model 3 of 8

 Estimated optimal model = response mean.
 Model 4 of 8
 Model 5 of 8
 Model 6 of 8
 Model 7 of 8
 Model 8 of 8

 Piecewise Linear GCV = 6.0243, #efprms = 3.5000


 Final Model (After Backward Stepwise Elimination)
 =================================================

 Basis Fun  Coefficient     Variable       Parent          Knot
 -----------------------------------------------------------------------
         0        5.0422
         1        0.3371       X3                        57.6300
         3       -2.2314       X4                         3.6700
         7        0.4891       X5                        40.2700
         8       -0.9538       X1                        69.0300
```

```
Piecewise Linear GCV = 5.8237, #efprms = 11.0000


ANOVA Decomposition on 4 Basis Functions
========================================

 fun    std. dev.         -gcv #bsfns  #efprms variable
-------------------------------------------------------
   1       2.2185      14.8517   1       2.5000       X3
   2       0.9244       6.1164   1       2.5000       X4
   3       1.3003       7.5470   1       2.5000       X5
   4       1.3499       7.6079   1       2.5000       X1

Piecewise Cubic Fit on 4 Basis Functions, GCV = 6.6210


Relative Variable Importance
============================

     Variable       Importance         -gcv
-------------------------------------------
   3        X3        100.0000      14.8517
   1        X1         44.4562       7.6079
   5        X5         43.6896       7.5470
   4        X4         18.0060       6.1164
   2        X2          0.0000       5.8237


ORDINARY LEAST SQUARES RESULTS
==============================

N: 24.0000                                 R-SQUARED: 0.7774
MEAN DEP VAR: 9.3183                   ADJ R-SQUARED: 0.7306
                  UNCENTERED R-SQUARED = R-0 SQUARED: 0.9819

   PARAMETER                   ESTIMATE         S.E.      T-RATIO       P-VALUE
-----------------------------------------------------------------------------
Constant                 |       5.0422       0.8121       6.2090   .577728E-05
Basis Function 1         |       0.3371       0.0477       7.0627   .101275E-05
Basis Function 3         |      -2.2314       0.7290      -3.0607        0.0064
Basis Function 7         |       0.4891       0.1223       4.0003        0.0008
Basis Function 8         |      -0.9538       0.2363      -4.0356        0.0007
-----------------------------------------------------------------------------
F-STATISTIC =  16.5928                     S.E. OF REGRESSION =  1.4691
    P-VALUE =  .529950E-05            RESIDUAL SUM OF SQUARES =  41.0086
  [MDF,NDF] = [ 4, 19 ]             REGRESSION SUM OF SQUARES =  143.2523
------------------------------------------------------------------------

The Following Graphics Are Piecewise Linear


PURE ORDINAL CONTRIBUTION:
   CURVE 1: X3 , max = 9.2636
             --------------------------------------------------------------
      9.2636 |                                                         ***|
             |                                                      ****  |
      8.1057 |                                                  ****      |
             |                                              ****          |
      6.9477 |                                           ****             |
             |                                       ****                 |
      5.7898 |                                   ****                     |
             |                                ****                        |
      4.6318 |                            ****                            |
             |                        ****                                |
      3.4739 |                     ****                                   |
             |                 ****                                       |
        3159 |             ****                                           |
             |          ****                                              |
        1580 |      ****                                                  |
             |  ****                                                      |
        0000 |***                                                         |
             --------------------------------------------------------------
          57.6300             |             71.3700          |          85.1100
```

```
                        64.5000                      78.2400

PURE ORDINAL CONTRIBUTION:
   CURVE 2: X4 , max = 3.7487
             --------------------------------------------------------------
      3.7487 |       *****************************************************|
             |                                                            |
      3.2801 |       *                                                    |
             |      *                                                     |
      2.8115 |     *                                                      |
             |                                                            |
      2.3430 |     *                                                      |
             |    *                                                       |
      1.8744 |    *                                                       |
             |                                                            |
      1.4058 |   *                                                        |
             |  *                                                         |
      0.9372 |  *                                                         |
             | *                                                          |
      0.4686 |                                                            |
             | *                                                          |
      0.0000 |*                                                           |
             --------------------------------------------------------------
          1.9900            |          8.7200            |          15.4500
                        5.3550                       12.0850

PURE ORDINAL CONTRIBUTION:
   CURVE 3: X5 , max = 6.9251
             --------------------------------------------------------------
      6.9251 |                                                         ***|
             |                                                      ****  |
      6.0595 |                                                  ****      |
             |                                              ****          |
      5.1938 |                                           ****             |
             |                                       ****                 |
      4.3282 |                                   ****                     |
             |                                ****                        |
      3.4626 |                            ****                            |
             |                        ****                                |
      2.5969 |                     ****                                   |
             |                 ****                                       |
      1.7313 |             ****                                           |
             |          ****                                              |
      0.8656 |      ****                                                  |
             |  ****                                                      |
      0.0000 |***                                                         |
             --------------------------------------------------------------
         40.2700            |          47.3500           |          54.4300
                        43.8100                      50.8900

PURE ORDINAL CONTRIBUTION:
   CURVE 4: X1 , max = 4.4732
             --------------------------------------------------------------
      4.4732 |*********************                                       |
             |                    ****                                    |
      3.9141 |                       ***                                  |
             |                          **                                |
      3.3549 |                            ***                             |
             |                              ***                           |
      2.7958 |                                 ***                        |
             |                                    ***                     |
      2.2366 |                                      ***                   |
             |                                         **                 |
      1.6775 |                                           ***              |
             |                                             ****           |
      1.1183 |                                                ***         |
             |                                                   **       |
        5592 |                                                     ***    |
             |                                                       ***  |
        0000 |                                                          **|
             --------------------------------------------------------------
         66.8100            |          70.2650           |          73.7200
                        68.5375                      71.9925
```

```
4 curves and 0 surfaces.


Basis Functions
===============

BF1 = max(0, X3 - 57.6300);
BF3 = max(0, 3.6700 - X4 );
BF7 = max(0, X5 - 40.2700);
BF8 = max(0, X1 - 69.0300);

Y = 5.0422 + 0.3371 * BF1 - 2.2314 * BF3 + 0.4891 * BF7
           - 0.9538 * BF8;

model Y1 = BF1 BF3 BF7 BF8;
```

Lampiran 3. Hasil Model Terbaik MARS Respon Indeks Pembangunan Manusia

```
LEARNING SAMPLE STATISTICS
 ==========================

 VARIABLE            MEAN          SD             N          SUM
 ----------------------------------------------------------------
       Y2         71.4354      3.9453       24.0000    1714.4500
       X1         69.8892      1.9381       24.0000    1677.3400
       X2         78.7138      3.4353       24.0000    1889.1300
       X3         67.2938      6.7226       24.0000    1615.0500
       X4          5.2775      2.5633       24.0000     126.6600
       X5         45.4279      2.7160       24.0000    1090.2700


 Ordinal Response
                      min         Q25          Q50          Q75          max
 ------------------------------------------------------------------------
       Y2         65.1300     69.6900      70.3600      71.9700      83.1200

 Ordinal Predictor Variables: 5
                      min         Q25          Q50          Q75          max
 ------------------------------------------------------------------------
       X1         66.8100     67.8200      70.1500      70.9400      73.7200
       X2         70.8900     76.2100      79.1000      80.8400      83.7600
       X3         57.6300     61.9000      65.2700      72.0500      85.1100
       X4          1.9900      3.8100       4.8700       5.4000      15.4500
       X5         40.2700     43.9200      45.1300      46.7200      54.4300


 Forward Stepwise Knot Placement
 ===============================

 BasFn(s)      GCV   IndBsFns EfPrms Variable             Knot       Parent  BsF
 -------------------------------------------------------------------------------
     0        16.2420    0.0    1.0
   2   1       8.6019    2.0    5.0       X1          72.4000
   4   3       4.9011    3.0    8.0       X1          70.7500
     5         6.3995    4.0   11.0       X3          57.6300
   7   6       9.0740    5.0   14.0       X1          71.1800
   9   8      18.6661    7.0   18.0       X2          82.8500
    10        63.1916    8.0   21.0       X5          40.2700

 Model 1 of 8

 Estimated optimal model = response mean.
 Model 2 of 8

 Estimated optimal model = response mean.
 Model 3 of 8
 Model 4 of 8
 Model 5 of 8
 Model 6 of 8
 Model 7 of 8
 Model 8 of 8

 Estimated optimal model = response mean.

 Piecewise Linear GCV = 16.2420, #efprms = 1.0000


 Final Model (After Backward Stepwise Elimination)
 =================================================

 Basis Fun  Coefficient     Variable       Parent          Knot
 ----------------------------------------------------------------------
          0      73.6424
          1    -16.9724       X1                          72.4000
          2     -1.0921       X1                          72.4000
          3      6.2320       X1                          70.7500

          e Linear GCV = 5.2224, #efprms = 8.5000
```

```
ANOVA Decomposition on 3 Basis Functions
========================================

 fun    std. dev.         -gcv #bsfns  #efprms variable
--------------------------------------------------------
   1      3.5691      16.2420    3      7.5000       X1

Piecewise Cubic Fit on 3 Basis Functions, GCV = 6.3289


Relative Variable Importance
============================

     Variable       Importance         -gcv
-------------------------------------------
   1       X1         100.0000      16.2420
   2       X2           0.0000       5.2224
   3       X3           0.0000       5.2224
   4       X4           0.0000       5.2224
   5       X5           0.0000       5.2224


ORDINARY LEAST SQUARES RESULTS
==============================

N: 24.0000                                R-SQUARED: 0.8540
MEAN DEP VAR: 71.4354                 ADJ R-SQUARED: 0.8321
                  UNCENTERED R-SQUARED = R-0 SQUARED: 0.9996

   PARAMETER                  ESTIMATE         S.E.      T-RATIO       P-VALUE
-----------------------------------------------------------------------------
Constant                 |       73.6424       0.9838      74.8567  .999201E-15
Basis Function 1         |      -16.9725       2.3392      -7.2556  .509390E-06
Basis Function 2         |       -1.0921       0.2773      -3.9382       0.0008
Basis Function 3         |        6.2320       1.1474       5.4313  .257146E-04
------------------------------------------------------------------------
F-STATISTIC =  38.9863                    S.E. OF REGRESSION =  1.6168
    P-VALUE =  .151943E-07              RESIDUAL SUM OF SQUARES =  52.2785
  [MDF,NDF] = [ 3, 20 ]               REGRESSION SUM OF SQUARES =  305.7213
------------------------------------------------------------------------

The Following Graphics Are Piecewise Linear

PURE ORDINAL CONTRIBUTION:
   CURVE 1: X1 , max = 16.342
             -------------------------------------------------------------
     16.3423 |                                                *           |
             |                                              ****          |
     14.2995 |                                             **  *          |
             |                                            **    *         |
     12.2567 |                                           **      *        |
             |                                          *         *       |
     10.2139 |                                         *          **      |
             |                                       **             *     |
      8.1712 |                                      **              *     |
             |                                     **                *    |
      6.1284 |                                    *                   *   |
             |                                   *                     *  |
      4.0856 |                            *******                      ** |
             |                    ********                              * |
      2.0428 |             ********                                      *|
             |    *********                                               |
      0.0000 |*****                                                       |
             -------------------------------------------------------------
          66.8100       |          70.2650        |          73.7200
                     68.5375                   71.9925

              and 0 surfaces.


            nctions
```

```
===============

BF1 = max(0, X1 - 72.4000);
BF2 = max(0, 72.4000 - X1 );
BF3 = max(0, X1 - 70.7500);

Y = 73.6424 - 16.9724 * BF1 - 1.0921 * BF2 + 6.2320 * BF3;

model Y2 = BF1 BF2 BF3;
>
```

Lampiran 4. Hasil Pemodelan Bagging MARS Respon Persentase Penduduk Miskin

```
$Resample01
Selected 5 of 8 terms, and 3 of 4 predictors
Termination condition: Reached nk 10
Importance: x1, x5, x3, x4-unused
Number of terms at each degree of interaction: 1 4 (additive
   model)
GCV 2.074656    RSS 19.4499    GRSq 0.552719    RSq 0.8097576

$Resample02
Selected 6 of 9 terms, and 4 of 4 predictors
Termination condition: Reached nk 10
Importance: x3, x4, x1, x5
Number of terms at each degree of interaction: 1 5 (additive
   model)
GCV 3.588347    RSS 25.26794    GRSq 0.6235233    RSq 0.8797267

$Resample03
Selected 5 of 8 terms, and 3 of 4 predictors
Termination condition: Reached nk 10
Importance: x3, x4, x5, x1-unused
Number of terms at each degree of interaction: 1 4 (additive
   model)
GCV 3.126089    RSS 29.30708    GRSq 0.5943904    RSq 0.8274817

$Resample04
Selected 6 of 9 terms, and 4 of 4 predictors
Termination condition: Reached nk 10
Importance: x3, x4, x5, x1
Number of terms at each degree of interaction: 1 5 (additive
   model)
GCV 1.584528    RSS 11.15771    GRSq 0.8073496    RSq 0.9384538
.
.
.
$Resample16
Selected 8 of 9 terms, and 4 of 4 predictors
Termination condition: Reached nk 10
Importance: x3, x5, x4, x1
Number of terms at each degree of interaction: 1 7 (additive
   model)
GCV 0.2970955    RSS 1.002697    GRSq 0.9673066    RSq 0.994994

14.12947
  - 0.3375309 * max(0, 69.03 -    x1)
  - 0.4358623 * max(0,    x1 - 69.03)
  - 0.4473715 * max(0, 74.66 -    x3)
  -  6.389547 * max(0,    x3 - 74.66)
  + 0.4009327 * max(0,    x4 -  6.18)
  - 0.8170762 * max(0, 44.55 -    x5)
  + 0.2101373 * max(0,    x5 - 44.55)
.
.
.

$Resample50
Selected 5 of 9 terms, and 4 of 4 predictors
      ation condition: Reached nk 10
      ance: x3, x4, x1, x5
       of terms at each degree of interaction: 1 4 (additive
      el)
      371832    RSS 26.92343    GRSq 0.7383014    RSq 0.8886915
```

Lampiran 5. Hasil Pemodelan Bagging MARS Respon Indeks Pembangunan Manusia

```
$Resample01
Selected 4 of 5 terms, and 1 of 1 predictors
Termination condition: RSq changed by less than 0.001 at 5 terms
Importance: x1
Number of terms at each degree of interaction: 1 3 (additive
   model)
GCV 3.635919    RSS 43.78252    GRSq 0.8196138    RSq 0.9014525

$Resample02
Selected 4 of 5 terms, and 1 of 1 predictors
Termination condition: RSq changed by less than 0.001 at 5 terms
Importance: x1
Number of terms at each degree of interaction: 1 3 (additive
   model)
GCV 4.616268    RSS 55.58756    GRSq 0.6527217    RSq 0.8102771

$Resample03
Selected 5 of 6 terms, and 1 of 1 predictors
Termination condition: Reached nk 10
Importance: x1
Number of terms at each degree of interaction: 1 4 (additive
   model)
GCV 0.8084382    RSS 7.579108    GRSq 0.9595956    RSq 0.9828148

$Resample04
Selected 5 of 6 terms, and 1 of 1 predictors
Termination condition: Reached nk 10
Importance: x1
Number of terms at each degree of interaction: 1 4 (additive
   model)
GCV 2.818748    RSS 26.42576    GRSq 0.784982    RSq 0.9085462
.
.
.

$Resample17
Selected 4 of 5 terms, and 1 of 1 predictors
Termination condition: RSq changed by less than 0.001 at 5 terms
Importance: x1
Number of terms at each degree of interaction: 1 3 (additive
   model)
GCV 0.7036284    RSS 8.472858    GRSq 0.914197    RSq 0.9531247

72.59497
  +   6.240287 * max(0,   x1 - 70.7)
  -  0.6347138 * max(0, 72.4 -   x1)
  -   16.38992 * max(0,   x1 - 72.4)
.
.
.

$Resample50
Selected 3 of 5 terms, and 1 of 1 predictors
Termination condition: RSq changed by less than 0.001 at 5 terms
Importance: x1
[illegible] of terms at each degree of interaction: 1 2 (additive
   [illegible]el)
[illegible]386881    RSS 35.90266    GRSq 0.4907824    RSq 0.6524999
```