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LAMPIRAN

Lampiran 1. Data Pendidikan SMP Sulawesi Selatan Tahun 2019

Klp.	No.	Nama Sekolah (SMP)	Level-1				Level-2	
			Y	X1	X2	X3	Z1	Z2
			Nilai UN	Peserta UN	PD	Guru	APK	APM
1	1	SMPN 10 MAKASSAR	47,70	280	870	39	85,24	70,47
	2	SMP ABDI PEMBANGUNAN	41,25	58	155	8	85,24	70,47
	3	SMP ANAK INDONESIA	41,86	15	84	1	85,24	70,47
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	191	MUHAMMADIYAH 2 MAKASSAR	43,03	105	275	16	85,24	70,47
2	1	SMP MUHAMMADIYAH PALOPO	48,67	30	125	10	101,63	82,4
	2	SMP NEGERI 5 PALOPO	48,08	138	467	32	101,63	82,4
	3	SMP NEGERI 8 PALOPO	49,08	235	830	47	101,63	82,4
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	23	TERPADU WAHDAH ISLAMIYAH	42,66	7	91	13	101,63	82,4
3	1	NEGERI 12 PAREPARE	43,22	78	249	27	88,07	70,47
	2	NEGERI 2 PAREPARE	55,27	314	1.017	64	88,07	70,47
	3	NEGERI 6 PAREPARE	44,41	81	245	27	88,07	70,47
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	22	AL BADAR BILALANG PAREPARE	46,22	9	42	2	88,07	70,47
4	1	SMPN 1 TURIKALE	45,71	347	888	56	80,58	66,44
	2	SMP ISLAM TERPADU AL ISHLAH	50,21	136	546	19	80,58	66,44
	3	SMP MUHAMMADIYAH MAROS	45,04	29	46	9	80,58	66,44
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	71	SMP ISLAM AL WASI	41,63	44	108	4	80,58	66,44
5	1	SMP NEGERI 1 BUNGORO	48,80	287	874	84	90,04	72,27
	2	SMP NEGERI 2 BUNGORO	55,70	75	249	26	90,04	72,27
	3	SMP NEGERI 3 BUNGORO	53,87	109	335	35	90,04	72,27
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	89	SMP NEGERI 2 MANDALLE	52,31	43	134	16	90,04	72,27
6	1	SMP NEGERI 1 SUNGGUMINASA	53,22	493	1.09	72	77,61	65,51
	2	SMP NEGERI 2 SUNGGUMINASA	46,29	440	1.331	66	77,61	65,51
	3	SMP NEGERI 3 SUNGGUMINASA	46,73	309	1.026	61	77,61	65,51
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

	109	SMP NEGERI 4 SATAP PARIGI	60,59	14	42	8	77,61	65,51
7	1	4 POLOMBANGKENG UTARA	51,94	10	64	12	90,01	72,84
	2	1 POLOMBANGKENG UTARA	51,63	255	834	63	90,01	72,84
	3	2 POLOMBANGKENG UTARA	42,12	130	407	31	90,01	72,84
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	43	SMP NEGERI 1 SANROBONE	45,93	112	320	36	90,01	72,84
8	1	SMP AL AMANAH JENEPONTO	34,34	19	33	3	70,96	72,84
	2	SMP NEGERI 1 BINAMU	42,47	251	182	23	70,96	72,84
	3	SMP NEGERI 2 BINAMU	40,97	130	51	19	70,96	72,84
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	75	SMP NEGERI 2 BATANG	44,07	35	38	4	70,96	72,84
9	1	SMP NEGERI 1 BARRU	48,75	281	783	54	84,07	60,09
	2	SMP NEGERI 2 BARRU	45,72	133	371	35	84,07	60,09
	3	SMP NEGERI 3 BARRU	44,11	116	276	25	84,07	60,09
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	38	SMP MUHAMMADIYAH TAKKALASI	37,46	10	32	5	84,07	60,09
10	1	SMP NEGERI 1 WATAMPONE	55,80	304	962	55	69,58	53,16
	2	SMP NEGERI 2 WATAMPONE	49,08	170	478	41	69,58	53,16
	3	SMP NEGERI 4 WATAMPONE	54,49	325	833	55	69,58	53,16
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	123	SMPN SATAP 5 TELLU LIMPOE	50,99	16	99	6	69,58	53,16
11	1	SMP NEGERI 1 SENGKANG	51,13	288	790	50	67,45	53,46
	2	SMP NEGERI 2 SENGKANG	45,86	193	640	47	67,45	53,46
	3	SMP NEGERI 3 SENGKANG	47,36	78	288	27	67,45	53,46
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	74	WAHDAH I ANABANUA	50,68	91	152	8	67,45	53,46
12	1	SMP NEGERI 1 WATANSOPPENG	61,49	199	554	56	68,4	51,36
	2	SMP NEGERI 2 WATANSOPPENG	52,03	136	390	40	68,4	51,36
	3	SMP NEGERI 3 WATANSOPPENG	49,56	133	310	37	68,4	51,36
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	38	SMP SATAP Negeri LabaE	49,24	15	47	8	68,4	51,36
13	1	SMP NEGERI 1 BANTAENG	52,19	191	556	37	72,4	50,53
	2	SMP NEGERI 2 BANTAENG	51,89	163	442	38	72,4	50,53

	3	SMP NEGERI 3 BANTAENG	57,13	34	178	13	72,4	50,53
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	37	SMP NEGERI 3 SINOA SATAP BATU TIROA	46,75	7	39	6	72,4	50,53
14	1	SMP NEGERI 4 BULUKUMBA	44,69	193	543	40	77,48	58,91
	2	SMP NEGERI 48 BULUKUMBA	76,51	27	91	12	77,48	58,91
	3	SMP NEGERI 5 BULUKUMBA	69,42	109	260	29	77,48	58,91
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	63	SATAP 7 BULUKUMBA	67,78	16	20	13	77,48	58,91
15	1	UPTD SMP NEGERI 12 SINJAI	48,57	92	324	25	72,06	55,28
	2	UPTD SMP NEGERI 14 SINJAI	45,57	82	232	25	72,06	55,28
	3	UPTD SMP NEGERI 23 SINJAI	47,29	118	323	31	72,06	55,28
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	43	UPTD SMPN 32 SINJAI	44,69	36	78	11	72,06	55,28
16	1	12 KEPULAUAN SELAYAR	54,46	26	68	14	99,77	65,8
	2	27 KEPULAUAN SELAYAR	54,46	26	90	14	99,77	65,8
	3	34 KEPULAUAN SELAYAR	69,08	48	128	15	99,77	65,8
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	52	47 SATAP KEPULAUAN SELAYAR	60,65	16	66	8	99,77	65,8
17	1	UPT SMP NEGERI 10 LEMBANG	43,19	16	50	10	84,02	67,37
	2	UPT SMP NEGERI 1 LEMBANG	42,92	185	521	41	84,02	67,37
	3	UPT SMP NEGERI 2 LEMBANG	44,08	101	283	24	84,02	67,37
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	56	NEGERI 2 MATTIRO SOMPE	45,40	132	358	26	84,02	67,37
18	1	SMP Negeri 1 Pangsid	59,15	228	769	49	69,69	57,26
	2	SMP NEGERI 2 PANGSID	47,30	108	306	38	69,69	57,26
	3	SMP NEGERI 3 PANGSID	43,09	95	301	33	69,69	57,26
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	48	SMP NEGERI 3 PANCA RIJANG	45,37	84	189	18	69,69	57,26
19	1	SMP NEGERI 1 ENREKANG	51,14	272	688	51	68,37	51,98
	2	SMP NEGERI 2 ENREKANG	46,80	114	297	32	68,37	51,98
	3	SMP NEGERI 4 ENREKANG	49,58	64	255	19	68,37	51,98
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	45	SMP NEGERI 5 ALLA	44,61	74	204	23	68,37	51,98

20	1	SMP NEGERI 1 Ponrang Selatan	42,97	41	88	14	82,78	65,73
	2	SMP NEGERI 3 BUA PONRANG	41,09	147	389	38	82,78	65,73
	3	NEGERI SATAP PACCERAKANG	40,55	55	160	17	82,78	65,73
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	78	SMPN 1 KUMILA SATU ATAP	68,16	15	42	7	82,78	65,73
21	1	SMP NEGERI 1 MAKALE	57,22	309	907	46	89,94	66,7
	2	SMP NEGERI 5 MAKALE	46,35	69	194	17	89,94	66,7
	3	SMP KATOLIK MAKALE	49,85	105	322	14	89,94	66,7
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	82	Satap 4 Bonggakaradeng	40,94	56	131	8	89,94	66,7
22	1	NEGERI 1 MASAMBA	46,60	243	661	43	80,19	61,75
	2	NEGERI 2 MASAMBA	44,32	165	413	36	80,19	61,75
	3	NEGERI 3 SATAP MASAMBA	40,59	13	47	7	80,19	61,75
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	73	NEGERI 3 SATAP RAMPI	57,48	12	25	10	80,19	61,75
23	1	SMP 1 RANTEPAO	48,36	465	1.188	64	99,54	72,27
	2	SMP 2 RANTEPAO	50,35	321	1.191	57	99,54	72,27
	3	SMP 3 RANTEPAO SATAP	46,23	28	115	8	99,54	72,27
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	77	SMP NEGERI 2 BANGKELEKILA	44,34	108	300	20	99,54	72,27
24	1	SMP NEGERI 1 MALILI	49,54	172	529	29	90,28	70,49
	2	SMP NEGERI 2 MALILI	52,73	179	444	30	90,28	70,49
	3	SMP NEGERI 3 MALILI	48,75	166	444	31	90,28	70,49
	⋮	⋮	⋮	⋮	⋮	⋮		
	40	SMP NEGERI 1 KALAENA	46,53	249	550	33	90,28	70,49

Lampiran 2. Output Pemilihan Kemiringan Acak pada Software R.Studio

```
> #pemilihan koefisien acak
> summary(model4)
Linear mixed model fit by maximum likelihood . t-tests use Sattert
hwaite's method ['lmerModLmerTest']
   Data: DataMLMnew

     AIC      BIC   logLik df.resid
 -9929.0  -9875.4   4974.5   1574

Scaled residuals:
    Min      1Q  Median      3Q     Max
-3.3420 -0.5897  0.1170  0.6522  3.2781

Random effects:
 Groups   Name        Variance  Std.Dev. Corr
 KLP      (Intercept) 7.601e-06 0.002757
          X1          4.797e-04 0.021901 0.03
 Residual             1.045e-04 0.010222
Number of obs: 1584, groups:  KLP, 24

Fixed effects:
              Estimate Std. Error         df t value Pr(>|t|)
(Intercept)  1.553e-01  1.286e-02  2.405e+01  12.078 1.06e-11 ***
X1          -1.393e-02  6.777e-03  4.888e+01  -2.055  0.04520 *
X2           1.346e-02  6.767e-03  1.580e+03   1.989  0.04685 *
X3           1.788e-02  3.283e-03  1.577e+03   5.447 5.93e-08 ***
Z1           4.116e-01  2.011e-01  2.599e+01   2.047  0.05094 .
Z2          -4.800e-01  1.663e-01  2.617e+01  -2.886  0.00771 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation of Fixed Effects:
   (Intr) X1     X2     X3     Z1
X1  0.003
X2  0.013 -0.379
X3 -0.055 -0.319 -0.237
Z1 -0.398  0.078 -0.104 -0.007
Z2 -0.185 -0.087  0.103  0.020 -0.827
> summ(model4)
MODEL INFO:
Observations: 1584
Dependent Variable: Y
Type: Mixed effects linear regression

MODEL FIT:
AIC = -9929.03, BIC = -9875.35
Pseudo-R² (fixed effects) = 0.09
Pseudo-R² (total) = 0.26

FIXED EFFECTS:
----------------------------------------------------------
                     Est.   S.E.   t val.      d.f.      p
---------------- ------- ------ -------- --------- ------
(Intercept)          0.16   0.01    12.08     24.05   0.00
```

```
X1                  -0.01   0.01    -2.06     48.88   0.05
X2                   0.01   0.01     1.99   1579.63   0.05
X3                   0.02   0.00     5.45   1576.61   0.00
Z1                   0.41   0.20     2.05     25.99   0.05
Z2                  -0.48   0.17    -2.89     26.17   0.01
------------------------------------------------------------

p values calculated using Satterthwaite d.f.

RANDOM EFFECTS:
------------------------------------
  Group       Parameter    Std. Dev.
---------- ------------- -----------
   KLP       (Intercept)     0.00
   KLP           X1          0.02
 Residual                     0.01
------------------------------------

Grouping variables:
-------------------------
 Group    # groups   ICC
------- ---------- ------
  KLP       24      0.07
-------------------------
> anova(model3,model4)
Data: DataMLMnew

       npar     AIC     BIC logLik  Chisq Df Pr(>Chisq)
model3    8 -9897.8 -9854.8 4956.9
model4   10 -9929.0 -9875.4 4974.5 35.278  2  2.186e-08 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

> summary(model4a)
Linear mixed model fit by maximum likelihood . t-tests use Sattert
hwaite's method ['lmerModLmerTest']
   Data: DataMLMnew

     AIC      BIC   logLik  df.resid
 -9928.0  -9874.3   4974.0    1574

Scaled residuals:
    Min      1Q  Median      3Q     Max
-3.3873 -0.5784  0.1153  0.6695  3.3753

Random effects:
 Groups   Name        Variance  Std.Dev. Corr
 KLP      (Intercept) 1.538e-05 0.003922
          X2          1.783e-03 0.042223 -0.32
 Residual             1.039e-04 0.010191
Number of obs: 1584, groups:  KLP, 24

Fixed effects:
              Estimate Std. Error         df t value Pr(>|t|)
(Intercept)  1.500e-01  1.441e-02  2.535e+01  10.406 1.22e-10 ***
X1          -2.214e-02  5.807e-03  1.093e+03  -3.812 0.000145 ***
X2           2.975e-02  1.377e-02  4.498e+01   2.160 0.036144 *
X3           1.489e-02  3.371e-03  1.555e+03   4.416 1.07e-05 ***
Z1           4.510e-01  2.240e-01  2.650e+01   2.013 0.054342 .
```

```
Z2          -4.672e-01  1.849e-01  2.693e+01  -2.526 0.017723 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation of Fixed Effects:
   (Intr) X1     X2     X3     Z1
X1 -0.010
X2 -0.001 -0.530
X3 -0.040 -0.257 -0.218
Z1 -0.400 -0.024  0.077 -0.070
Z2 -0.187  0.031 -0.092  0.081 -0.824
> summ(model4a)
MODEL INFO:
Observations: 1584
Dependent Variable: Y
Type: Mixed effects linear regression

MODEL FIT:
AIC = -9927.98, BIC = -9874.31
Pseudo-R² (fixed effects) = 0.10
Pseudo-R² (total) = 0.30

FIXED EFFECTS:
----------------------------------------------------------
                     Est.   S.E.   t val.      d.f.      p
----------------- ------- ------ -------- --------- ------
(Intercept)           0.15   0.01    10.41     25.35   0.00
X1                   -0.02   0.01    -3.81   1092.85   0.00
X2                    0.03   0.01     2.16     44.98   0.04
X3                    0.01   0.00     4.42   1554.67   0.00
Z1                    0.45   0.22     2.01     26.50   0.05
Z2                   -0.47   0.18    -2.53     26.93   0.02
----------------------------------------------------------

p values calculated using Satterthwaite d.f.

RANDOM EFFECTS:
------------------------------------
  Group       Parameter    Std. Dev.
---------- ------------- -----------
   KLP       (Intercept)     0.00
   KLP           X2          0.04
 Residual                    0.01
------------------------------------

Grouping variables:
-------------------------
 Group    # groups   ICC
------- ---------- ------
  KLP       24      0.13
-------------------------
> anova(model3,model4a)
Data: DataMLMnew
        npar     AIC     BIC logLik   Chisq Df Pr(>Chisq)
model3     8 -9897.8 -9854.8 4956.9
model4a   10 -9928.0 -9874.3 4974.0  34.233  2  3.684e-08 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

```
> summary(model4b)
Linear mixed model fit by maximum likelihood . t-tests use Sattert
hwaite's method ['lmerModLmerTest']
   Data: DataMLMnew

     AIC      BIC   logLik  df.resid
 -9916.4  -9862.7   4968.2    1574

Scaled residuals:
    Min      1Q  Median      3Q     Max
-3.4725 -0.5989  0.1165  0.6477  4.0012

Random effects:
 Groups   Name        Variance  Std.Dev. Corr
 KLP      (Intercept) 1.572e-05 0.003965
          X3          2.234e-04 0.014948 -0.31
 Residual             1.051e-04 0.010252
Number of obs: 1584, groups:  KLP, 24

Fixed effects:
              Estimate Std. Error         df t value Pr(>|t|)
(Intercept)  1.533e-01  1.507e-02  2.528e+01  10.169 2.03e-10 ***
X1          -1.513e-02  4.985e-03  1.536e+03  -3.036  0.00244 **
X2           1.317e-02  6.791e-03  1.576e+03   1.940  0.05259 .
X3           1.646e-02  4.930e-03  3.777e+01   3.338  0.00191 **
Z1           4.553e-01  2.433e-01  2.958e+01   1.872  0.07119 .
Z2          -4.974e-01  1.998e-01  2.944e+01  -2.489  0.01869 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation of Fixed Effects:
   (Intr) X1     X2     X3     Z1
X1 -0.034
X2  0.006 -0.499
X3  0.001 -0.365 -0.165
Z1 -0.403  0.077 -0.061  0.009
Z2 -0.162 -0.062  0.061 -0.035 -0.836
> summ(model4b)
MODEL INFO:
Observations: 1584
Dependent Variable: Y
Type: Mixed effects linear regression

MODEL FIT:
AIC = -9916.38, BIC = -9862.70
Pseudo-R² (fixed effects) = 0.09
Pseudo-R² (total) = 0.28

FIXED EFFECTS:
----------------------------------------------------------
                     Est.   S.E.   t val.      d.f.      p
----------------- ------- ------ -------- --------- ------
(Intercept)          0.15   0.02    10.17     25.28   0.00
X1                  -0.02   0.00    -3.04   1536.25   0.00
X2                   0.01   0.01     1.94   1576.15   0.05
X3                   0.02   0.00     3.34     37.77   0.00
Z1                   0.46   0.24     1.87     29.58   0.07
Z2                  -0.50   0.20    -2.49     29.44   0.02
----------------------------------------------------------
```

p values calculated using Satterthwaite d.f.

```
RANDOM EFFECTS:
------------------------------------
  Group       Parameter    Std. Dev.
---------- ------------- -----------
   KLP       (Intercept)     0.00
   KLP           X3          0.01
 Residual                    0.01
------------------------------------

Grouping variables:
-------------------------
 Group    # groups   ICC
------- ---------- ------
  KLP       24      0.13
-------------------------
> anova(model3,model4b)
Data: DataMLMnew

        npar     AIC     BIC logLik  Chisq Df Pr(>Chisq)
model3     8 -9897.8 -9854.8 4956.9
model4b   10 -9916.4 -9862.7 4968.2  22.628  2   1.22e-05 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
> anova(model4,model4a,model4b)
Data: DataMLMnew
        npar     AIC     BIC logLik Chisq Df Pr(>Chisq)
model4    10 -9929.0 -9875.4 4974.5
model4a   10 -9928.0 -9874.3 4974.0       0      0
model4b   10 -9916.4 -9862.7 4968.2       0      0
```