

LAMPIRAN 1

ANOVA TEGANGAN SEL SURYA

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General Linear Model: Tegangan_ versus Alfa, Tinggi, Warna

Method

Factor coding (-1, 0, +1)

Factor Information

Factor	Type	Levels	Values
Alfa	Fixed	3	50, 57, 65
Tinggi	Fixed	3	6, 11, 15
Warna	Fixed	3	hijau, kuning, merah

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Alfa	2	0.009985	0.004993	54.57	0.000
Tinggi	2	0.005807	0.002904	31.74	0.000
Warna	2	0.001296	0.000648	7.09	0.005
Error	20	0.001830	0.000091		
Lack-of-Fit	2	0.001296	0.000648	21.88	0.000
Pure Error	18	0.000533	0.000030		
Total	26	0.018919			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.0095646	90.33%	87.43%	82.37%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	8.20259	0.00184	4456.22	0.000	
Alfa					
50	-0.02148	0.00260	-8.25	0.000	1.33
57	-0.00370	0.00260	-1.42	0.170	1.33
Tinggi					
6	-0.01926	0.00260	-7.40	0.000	1.33
11	0.00296	0.00260	1.14	0.268	1.33
Warna					
hijau	-0.00926	0.00260	-3.56	0.002	1.33
kuning	0.00185	0.00260	0.71	0.485	1.33

Regression Equation

$$\begin{aligned} \text{Tegangan}_i = & 8.20259 - 0.02148 \text{ Alfa}_{50} - 0.00370 \text{ Alfa}_{57} + 0.02519 \text{ Alfa}_{65} - \\ & 0.01926 \text{ Tinggi}_6 \\ & + 0.00296 \text{ Tinggi}_{11} + 0.01630 \text{ Tinggi}_{15} - 0.00926 \text{ Warna}_{\text{hijau}} \\ & + 0.00185 \text{ Warna}_{\text{kuning}} + 0.00741 \text{ Warna}_{\text{merah}} \end{aligned}$$

LAMPIRAN 2

ANOVA ARUS SEL SURYA

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General Linear Model: Arus_ versus Alfa, Tinggi, Warna

Method

Factor coding (-1, 0, +1)

Factor Information

Factor	Type	Levels	Values
Alfa	Fixed	3	50, 57, 65
Tinggi	Fixed	3	6, 11, 15
Warna	Fixed	3	hijau, kuning, merah

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Alfa	2	1.6089	0.80444	75.42	0.000
Tinggi	2	4.5089	2.25444	211.35	0.000
Warna	2	11.4956	5.74778	538.85	0.000
Error	20	0.2133	0.01067		
Lack-of-Fit	2	0.1267	0.06333	13.15	0.000
Pure Error	18	0.0867	0.00481		
Total	26	17.8267			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.103280	98.80%	98.44%	97.82%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	34.4444	0.0199	1732.95	0.000	
Alfa					
50	-0.3333	0.0281	-11.86	0.000	1.33
57	0.0889	0.0281	3.16	0.005	1.33
Tinggi					
6	-0.5778	0.0281	-20.55	0.000	1.33
11	0.2778	0.0281	9.88	0.000	1.33
Warna					
hijau	-0.7444	0.0281	-26.48	0.000	1.33
kuning	-0.1000	0.0281	-3.56	0.002	1.33

Regression Equation

Arus_ = 34.4444 - 0.3333 Alfa_50 + 0.0889 Alfa_57 + 0.2444 Alfa_65 - 0.5778
Tinggi_6
+ 0.2778 Tinggi_11 + 0.3000 Tinggi_15 - 0.7444 Warna_hijau - 0.1000
Warna_kuning
+ 0.8444 Warna_merah

LAMPIRAN 3

SNR TEGANGAN DAN ARUS SEL SURYA

2/28/2015 10:57:10 AM

Taguchi Analysis: Tegangan (n1), Tegangan (n2), Tegangan (n3) versus Alfa, Tinggi, Warna

Response Table for Signal to Noise Ratios
Larger is better

Level	Alfa	Tinggi	Warna
1	18.26	18.26	18.27
2	18.28	18.28	18.28
3	18.31	18.30	18.29
Delta	0.05	0.04	0.02
Rank	1	2	3

Response Table for Means

Level	Alfa	Tinggi	Warna
1	8.181	8.183	8.193
2	8.199	8.206	8.204
3	8.228	8.219	8.210
Delta	0.047	0.036	0.017
Rank	1	2	3

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Taguchi Analysis: Arus (n1), Arus (n2), Arus (n3) versus Alfa, Tinggi, Warna

Response Table for Signal to Noise Ratios
Larger is better

Level	Alfa	Tinggi	Warna
1	30.65	30.59	30.55
2	30.76	30.81	30.72
3	30.80	30.82	30.95
Delta	0.15	0.22	0.40
Rank	3	2	1

Response Table for Means

Level	Alfa	Tinggi	Warna
1	34.11	33.87	33.70
2	34.53	34.72	34.34
3	34.69	34.74	35.29
Delta	0.58	0.88	1.59
Rank	3	2	1

LAMPIRAN 4

UJI BEDA TEGANGAN DAN ARUS SEL SURYA

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Retrieving project from file: 'C:\Users\werkudoro\Desktop\Data thesis ujian\Final\edit a\uji beda tegangan dan arus.MPJ'

Paired T-Test and CI: Tegangan DP, Tegangan TP

Paired T for Tegangan DP - Tegangan TP

	N	Mean	StDev	SE Mean
Tegangan DP	3	8.2533	0.0058	0.0033
Tegangan TP	3	8.1333	0.0208	0.0120
Difference	3	0.1200	0.0173	0.0100

95% lower bound for mean difference: 0.0908

T-Test of mean difference = 0 (vs > 0): T-Value = 12.00 P-Value = 0.003

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Paired T-Test and CI: Arus DP, Arus TP

Paired T for Arus DP - Arus TP

	N	Mean	StDev	SE Mean
Arus DP	3	35.9000	0.1000	0.0577
Arus TP	3	29.7333	0.1528	0.0882
Difference	3	6.167	0.231	0.133

95% lower bound for mean difference: 5.777

T-Test of mean difference = 0 (vs > 0): T-Value = 46.25 P-Value = 0.000

LAMPIRAN 5

UJI BEDA TEGANGAN DAN ARUS SEL SURYA ANTARA KONDISI LAPANGAN DAN LABORATORIUM

3/13/2016 11:14:38 AM

Paired T-Test and CI: Tegangan DPLapangan, Tegangan DPLaborat

Paired T for Tegangan DPLapangan - Tegangan DPLaborat

	N	Mean	StDev	SE Mean
Tegangan DPLapangan	3	8.16333	0.00577	0.00333
Tegangan DPLaborat	3	8.25333	0.00577	0.00333
Difference	3	-0.09000	0.01000	0.00577

95% CI for mean difference: (-0.11484, -0.06516)

T-Test of mean difference = 0 (vs \neq 0): T-Value = -15.59 P-Value = 0.004

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Paired T-Test and CI: Arus DPLapangan, Arus DPLaborat

Paired T for Arus DPLapangan - Arus DPLaborat

	N	Mean	StDev	SE Mean
Arus DPLapangan	3	89.2333	0.0577	0.0333
Arus DPLaborat	3	35.9000	0.1000	0.0577
Difference	3	53.3333	0.1155	0.0667

95% CI for mean difference: (53.0465, 53.6202)

T-Test of mean difference = 0 (vs \neq 0): T-Value = 800.00 P-Value = 0.000

LAMPIRAN 6

TABEL DISTRIBUSI F

The F Distribution

In order to use the F table, first select the significance level to be used, and then determine the appropriate combination of degrees of freedom. For example, if the $\alpha = 0.10$ level of significance is selected, use the first F table. If there are 5 degrees of freedom in the numerator, and 7 degrees of freedom in the denominator, the F value from the table is 2.88. This means that there is exactly 0.10 of the area under the F curve that lies to the right of $F = 2.88$.

When the significance level is $\alpha = 0.05$, use the second F table. If there are 20 degrees of freedom in the numerator, and 5 degrees of freedom in the denominator, then the critical F value is 4.56. This could be written

$$F_{20,5;0.05} = 4.56$$

That is, for 20 and 5 degrees of freedom, the F value that leaves exactly 0.05 of the area under the F curve in the right tail of the distribution is 4.56.

For the $\alpha = 0.01$ level of significance, the third F table is used. Suppose that there is 1 degree of freedom in the numerator and 12 degrees of freedom in the denominator. Then

$$F_{1,12;0.01} = 9.33.$$

An F value of 9.33 leaves exactly 0.01 of area under the curve in the right tail of the distribution when there are 1 and 12 degrees of freedom.

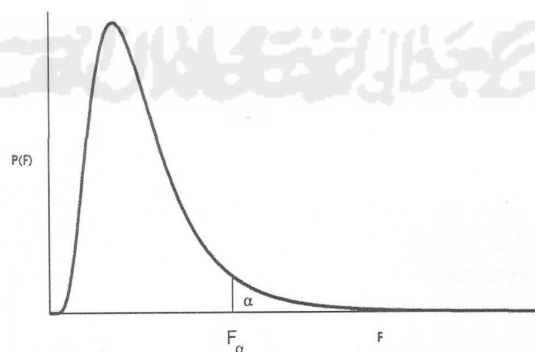


Figure K.1: The F distribution

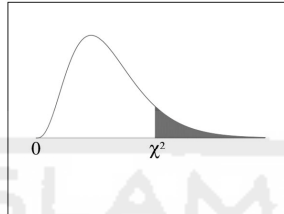
F Values for $\alpha = 0.05$

d_2	d_1								
	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.51	19.00	19.16	19.25	19.3	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96
inf	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

LAMPIRAN 7

TABEL DISTRIBUSI CHI-SQUARE

Chi-Square Distribution Table



The shaded area is equal to α for $\chi^2 = \chi^2_{\alpha}$.

<i>df</i>	$\chi^2_{.995}$	$\chi^2_{.990}$	$\chi^2_{.975}$	$\chi^2_{.950}$	$\chi^2_{.900}$	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169