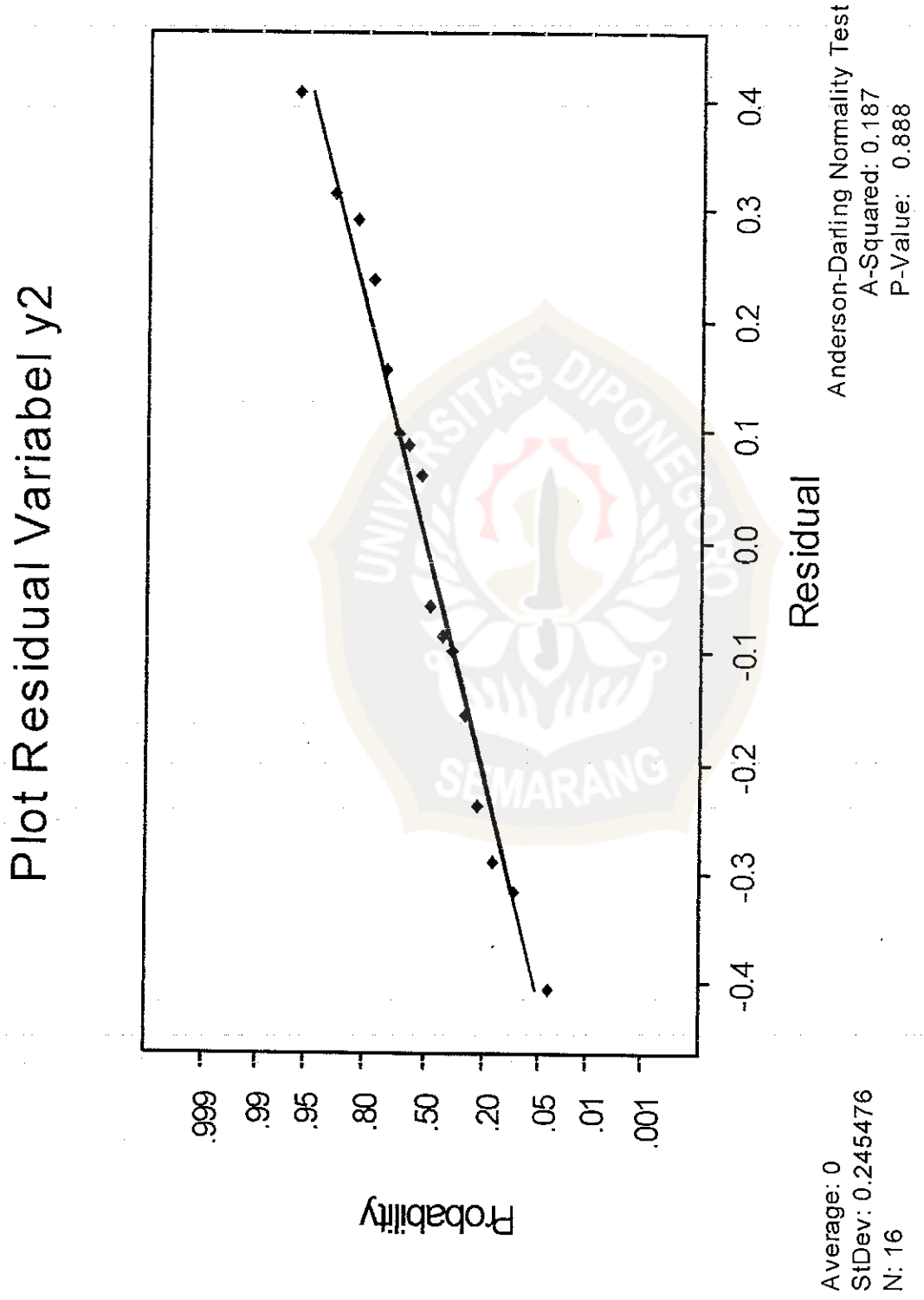
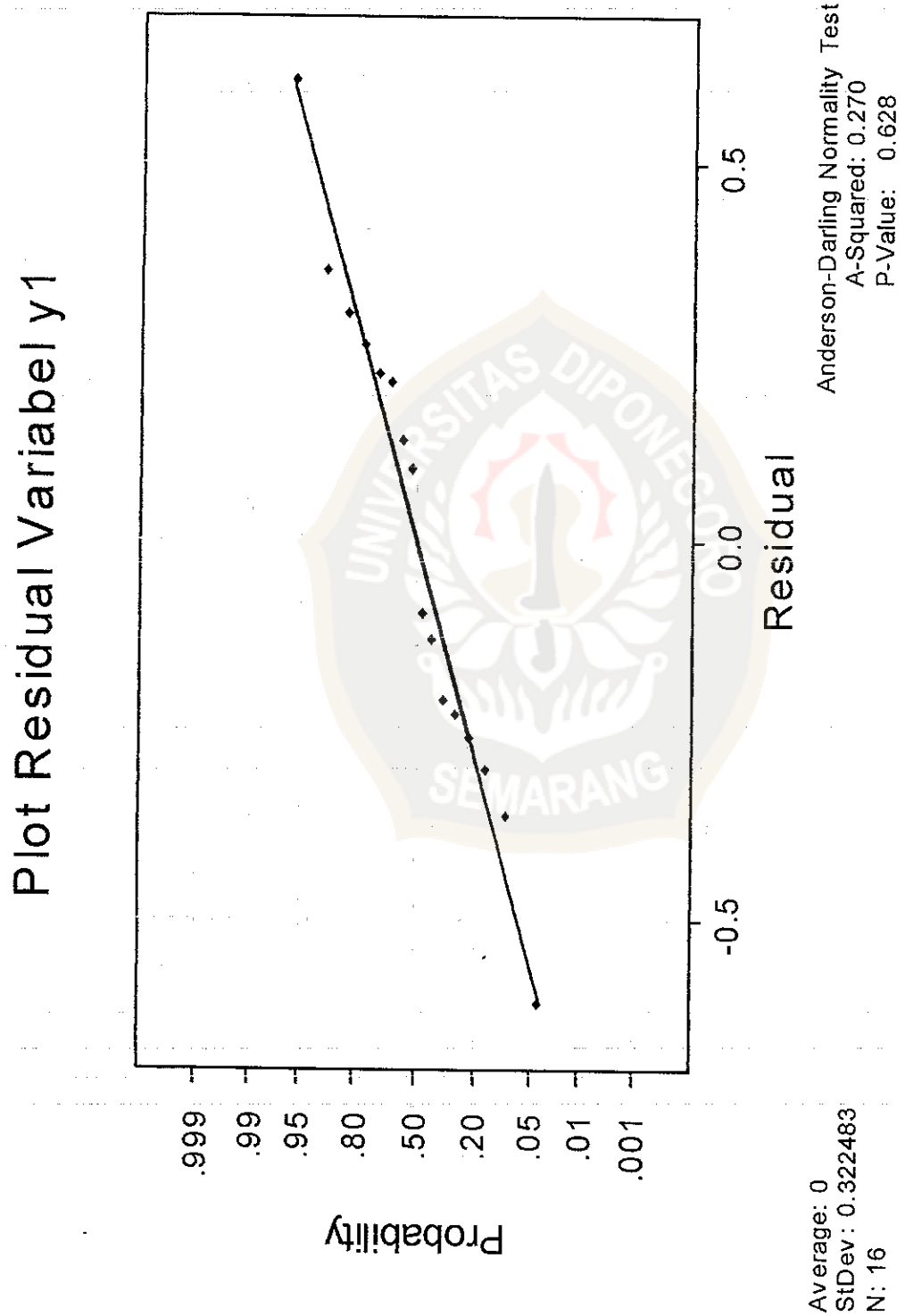
LAMPIRAN

Lampiran 1. Pemeriksaan Asumsi Normalitas Error Variabel y_1



Lampiran 2. Pemeriksaan Asumsi Normalitas Error Variabel y_2



Lampiran 3. Pemeriksaan Asumsi Kesamaan Matrik Kovarian dan Perhitungan MANOVA

data pada tabel 3.4.1

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03 Aug 00 SPSS for MS WINDOWS Release 6.0
* * * * * * A n a l y s i s   o f   V a r i a n c e * * * * * *

        16 cases accepted.
         0 cases rejected because of out-of-range factor values.
         0 cases rejected because of missing data.
         4 non-empty cells.
         1 design will be processed.

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
CELL NUMBER
                  1     2     3     4
 Variable
   X              1     2     3     4

Cell Number .. 1

 Determinant of Covariance matrix of dependent variables =   .00857
 LOG(Determinant) =                                        -4.75894

 - - - - - - - - - -

 Cell Number .. 2

 Determinant of Covariance matrix of dependent variables =   .00007
 LOG(Determinant) =                                        -9.56461

 - - - - - - - - - -

 Cell Number .. 3

 Determinant of Covariance matrix of dependent variables =   .00420
 LOG(Determinant) =                                        -5.47372

 - - - - - - - - - -

 Cell Number .. 4

 Determinant of Covariance matrix of dependent variables =   .00236
 LOG(Determinant) =                                        -6.04718

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```

Determinant of pooled Covariance matrix of dependent vars.= 00557
LOG(Determinant) = -5.19067
Multivariate test for Homogeneity of Dispersion matrices

Boxs M = 15.24533
F WITH (9,1650) DF = 1.17494, P = .307 (Approx.)
Chi-Square with 9 DF = 10.65761, P = .300 (Approx.)

- -

WITHIN+RESIDUAL Sum-of-Squares and Cross-Products

	Y1	Y2
Y1	1.560	
Y2	.780	.904

- -

* * * A n a l y s i s o f V a r i a n c e -- design 1 * * *

EFFECT .. X
Adjusted Hypothesis Sum-of-Squares and Cross-Products

	Y1	Y2
Y1	2.371	
Y2	2.421	2.478

- -

Multivariate Tests of Significance (S = 2, M = 0, N = 4 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig.of F
Pillais	.74095	2.35402	6.00	24.00	.063
Hotellings	2.78360	4.63934	6.00	20.00	.004
Wilks	.26320	3.48041	6.00	22.00	.014
Roys	.73530				

Note.. F statistic for WILKS' Lambda is exact.

- -

Lampiran 4. Perhitungan Kontras 1

Perhitungan untuk variabel y_1

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_i$	c_i^2
	1	2	3	4				
A	8.85	9.67	10.07	9.25	9.46	1	9.46	1
B	9.415	10.015	9.62	9.81	9.715	-1	-9.715	1
C	8.82	9.54	9.44	8.92	9.18	0	0	0
D	8.45	8.9	8.55	8.81	8.6775	0	0	0
						jumlah	-0.255	2

Perhitungan untuk variabel y_2

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_{i.}$	c_i^2
	1	2	3	4				
A	8.345	8.977	8.721	8.601	8.661	1	8.661	1
B	8.465	9.279	8.785	8.959	8.872	-1	-8.872	1
C	8.115	8.591	8.255	8.451	8.353	0	0	0
D	7.535	8.117	7.982	7.67	7.826	0	0	0
						jumlah	-0.211	2

$$\mathbf{G} = \begin{bmatrix} 1.56 & 0.78 \\ 0.78 & 0.904 \end{bmatrix}$$

$\det(\mathbf{G}) = 0.80184$

$$\mathbf{G}^{-1} = \begin{bmatrix} 1.12741 & -0.97276 \\ -0.97276 & 1.94553 \end{bmatrix}$$

$\mathbf{T}^2 = 1.32594$

Lampiran 5. Perhitungan Kontras 2

Perhitungan untuk variabel y_1

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_i$	c_i^2
	1	2	3	4				
A	8.85	9.67	10.07	9.25	9.46	0	0	0
B	9.415	10.015	9.62	9.81	9.715	0	0	0
C	8.82	9.54	9.44	8.92	9.18	1	9.18	1
D	8.45	8.9	8.55	8.81	8.6775	-1	-8.6775	1
						jumlah	0.5025	2

Perhitungan untuk variabel y_2

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_{i.}$	c_i^2
	1	2	3	4				
A	8.345	8.977	8.721	8.601	8.661	0	0	0
B	8.465	9.279	8.785	8.959	8.872	0	0	0
C	8.115	8.591	8.255	8.451	8.353	1	8.353	1
D	7.535	8.117	7.982	7.67	7.826	-1	-7.826	1
						jumlah	0.527	2

$$\mathbf{G} = \begin{bmatrix} 1.56 & 0.78 \\ 0.78 & 0.904 \end{bmatrix}$$

$$\det(\mathbf{G}) = 0.80184$$

$$\mathbf{G}^{-1} = \begin{bmatrix} 1.12741 & -0.97276 \\ -0.97276 & 1.94553 \end{bmatrix}$$

$$\mathbf{T}^2 = 7.43513$$

Lampiran 6. Perhitungan Kontras 3

Perhitungan untuk variabel y_1

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_i$	c_i^2
	1	2	3	4				
A	8.85	9.67	10.07	9.25	9.46	1	9.46	1
B	9.415	10.015	9.62	9.81	9.715	1	9.715	1
C	8.82	9.54	9.44	8.92	9.18	-1	-9.18	1
D	8.45	8.9	8.55	8.81	8.6775	-1	-8.6775	1
						jumlah	1.3175	4

Perhitungan untuk variabel y_2

perlakuan	ulangan				$y_{i.}$	c_i	$c_i y_{i.}$	c_i^2
	1	2	3	4				
A	8.345	8.977	8.721	8.601	8.661	1	8.661	1
B	8.465	9.279	8.785	8.959	8.872	1	8.872	1
C	8.115	8.591	8.255	8.451	8.353	-1	-8.353	1
D	7.535	8.117	7.982	7.67	7.826	-1	-7.826	1
						jumlah	1.354	4

$$\mathbf{G} = \begin{bmatrix} 1.56 & 0.78 \\ 0.78 & 0.904 \end{bmatrix}$$

$$\det(\mathbf{G}) = 0.80184$$

$$\mathbf{G}^{-1} = \begin{bmatrix} 1.12741 & -0.97276 \\ -0.97276 & 1.94553 \end{bmatrix}$$

$$\mathbf{T}^2 = 24.6373$$

Lampiran 7. Tabel Lee, et. al untuk $\alpha = 0{,}05$

Table B.8. Test for Equal Covariance Matrices, $\alpha = .05$

ν	k = 2	3	4	5	6	7	8	9	10
				$p = 2$					
3	12.18	18.70	24.55	30.09	35.45	40.68	45.81	50.87	55.86
4	10.70	16.65	22.00	27.07	31.97	36.75	41.45	46.07	50.64
5	9.97	15.63	20.73	25.57	30.23	34.79	39.26	43.67	48.02
6	9.53	15.02	19.97	24.66	29.19	33.61	37.95	42.22	46.45
7	9.24	14.62	19.46	24.05	28.49	32.83	37.08	41.26	45.40
8	9.04	14.33	19.10	23.62	27.99	32.26	36.44	40.57	44.64
9	8.88	14.11	18.83	23.30	27.62	31.84	35.98	40.05	44.08
10	8.76	13.94	18.61	23.05	27.33	31.51	35.61	39.65	43.64
11	8.67	13.81	18.44	22.85	27.10	31.25	35.32	39.33	43.29
12	8.59	13.70	18.30	22.68	26.90	31.03	35.08	39.07	43.00
13	8.52	13.60	18.19	22.54	26.75	30.85	34.87	38.84	42.76
14	8.47	13.53	18.10	22.42	26.61	30.70	34.71	38.66	42.56
15	8.42	13.46	18.01	22.33	26.50	30.57	34.57	38.50	42.38
16	8.38	13.40	17.94	22.24	26.40	30.45	34.43	38.36	42.23
17	8.35	13.35	17.87	22.17	26.31	30.35	34.32	38.24	42.10
18	8.32	13.30	17.82	22.10	26.23	30.27	34.23	38.13	41.99
19	8.28	13.26	17.77	22.04	26.16	30.19	34.14	38.04	41.88
20	8.26	13.23	17.72	21.98	26.10	30.12	34.07	37.95	41.79
25	8.17	13.10	17.55	21.79	25.87	29.86	33.78	37.63	41.44
30	8.11	13.01	17.44	21.65	25.72	29.69	33.59	37.42	41.21

Note: Table contains upper percentage points for

$$-2\ln M = \nu\left(k\ln|S| - \sum_{i=1}^{k}\ln|S_i|\right)$$

for k samples, each with ν degrees of freedom. Reject H_0: $\Sigma_1 = \Sigma_2 = \cdots = \Sigma_k$ if $-2\ln M >$ table value.

Lampiran 8. Tabel Wilks' Λ untuk $\alpha = 0{,}05$

Table B.4. Lower Critical Values of Wilks Λ, $\alpha = 0.05$

$$\Lambda = \frac{|E|}{|E+H|} = \prod_{i=1}^{s} \frac{1}{1+\lambda_i}, \text{ where } \lambda_1, \lambda_2, \ldots, \lambda_s \text{ are eigenvalues of } E^{-1}H.$$

Reject H_0 if $\Lambda \leq$ table value.

ν_E	ν_H = 1	2	3	4	5	6	7	8	9	10	11	12
						$p = 2$						
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	2.50[a]	.641[a]	.287[a]	.162[a]	.104[a]	.072[a]	.053[a]	.041[a]	.032[a]	.026[a]	.022[a]	.018[a]
3	.050	.018	9.53[a]	5.84[a]	3.95[a]	2.85[a]	2.15[a]	1.68[a]	1.35[a]	1.11[a]	.928[a]	.787[a]
4	.136	.062	.036	.023	.017	.012	9.56[a]	7.62[a]	6.21[a]	5.17[a]	4.36[a]	3.73[a]
5	.224	.117	.074	.051	.037	.028	.023	.018	.015	.013	.011	.009
6	.302	.175	.116	.084	.063	.049	.040	.033	.027	.023	.020	.017
7	.368	.230	.160	.119	.092	.074	.060	.050	.042	.036	.032	.028
8	.426	.280	.203	.155	.122	.099	.082	.069	.059	.051	.045	.040
9	.473	.326	.243	.190	.153	.126	.106	.090	.078	.068	.060	.053
10	.514	.367	.281	.223	.183	.152	.129	.111	.097	.085	.075	.067
11	.549	.404	.316	.255	.212	.179	.153	.133	.116	.102	.091	.082
12	.580	.437	.348	.286	.240	.204	.176	.154	.136	.120	.108	.097
13	.607	.467	.378	.314	.266	.229	.199	.175	.155	.138	.124	.112
14	.631	.495	.405	.340	.291	.252	.221	.195	.174	.156	.141	.128
15	.652	.519	.431	.365	.315	.275	.242	.215	.193	.174	.157	.143
16	.671	.542	.454	.389	.337	.296	.263	.235	.211	.191	.174	.159
17	.688	.562	.476	.410	.359	.317	.282	.254	.229	.208	.190	.174
18	.703	.581	.496	.431	.379	.337	.301	.272	.246	.225	.206	.189
19	.717	.598	.515	.450	.398	.355	.320	.289	.263	.241	.221	.204
20	.730	.614	.532	.468	.416	.373	.337	.306	.279	.256	.236	.218
21	.741	.629	.548	.485	.433	.390	.354	.322	.295	.271	.251	.232
22	.752	.643	.564	.501	.449	.406	.370	.338	.310	.286	.265	.246
23	.762	.656	.578	.516	.465	.422	.385	.353	.325	.300	.279	.259
24	.771	.668	.591	.530	.479	.436	.399	.367	.339	.314	.292	.272
25	.779	.679	.604	.544	.493	.450	.413	.381	.353	.328	.305	.285
26	.787	.689	.616	.556	.506	.464	.427	.395	.366	.341	.318	.297
27	.794	.699	.627	.568	.519	.477	.440	.407	.379	.353	.330	.309
28	.801	.708	.638	.580	.531	.489	.452	.420	.391	.365	.342	.321
29	.807	.717	.648	.591	.542	.501	.464	.432	.403	.377	.354	.332
30	.813	.725	.657	.601	.553	.512	.475	.443	.414	.388	.365	.344
40	.858	.786	.730	.682	.640	.602	.568	.537	.509	.484	.460	.439
60	.903	.853	.811	.774	.741	.710	.682	.656	.632	.609	.588	.568
80	.927	.888	.854	.825	.798	.772	.749	.727	.706	.686	.667	.649
100	.941	.909	.882	.857	.834	.813	.793	.774	.755	.738	.721	.705
120	.951	.924	.900	.879	.860	.841	.823	.807	.791	.775	.760	.746
140	.958	.934	.914	.895	.878	.862	.846	.831	.817	.803	.790	.777
170	.965	.946	.929	.913	.898	.885	.871	.859	.846	.834	.823	.812
200	.970	.954	.939	.926	.913	.901	.889	.878	.867	.857	.847	.837
240	.975	.961	.949	.938	.927	.917	.907	.897	.888	.879	.870	.862
320	.981	.971	.962	.953	.945	.937	.929	.922	.914	.907	.901	.894
440	.986	.979	.972	.965	.959	.953	.948	.942	.937	.932	.926	.921
600	.990	.984	.979	.975	.970	.966	.961	.957	.953	.949	.945	.942
800	.993	.988	.984	.981	.977	.974	.971	.968	.965	.962	.959	.956
1000	.994	.991	.987	.985	.982	.979	.977	.974	.972	.969	.967	.964

[a]Multiply entry by 10^{-3}.

(continued)

Lampiran 9. Tabel Hotelling's T^2 untuk $\alpha = 0{,}05$

Table B.1. Upper Percentage Points of Hotelling's T^2-Distribution

Degrees of freedom, ν	Number of Variables, p									
	1	2	3	4	5	6	7	8	9	10
	$\alpha = 0.05$									
2	18.513									
3	10.128	57.000								
4	7.709	25.472	114.986							
5	6.608	17.361	46.383	192.468						
6	5.987	13.887	29.661	72.937	289.446					
7	5.591	12.001	22.720	44.718	105.157	405.920				
8	5.318	10.828	19.028	33.230	62.561	143.050	541.890			
9	5.117	10.033	16.766	27.202	45.453	83.202	186.622	697.356		
10	4.965	9.459	15.248	23.545	36.561	59.403	106.649	235.873	872.317	
11	4.844	9.026	14.163	21.108	31.205	47.123	75.088	132.903	290.806	1066.774
12	4.747	8.689	13.350	19.376	27.656	39.764	58.893	92.512	161.967	351.421
13	4.667	8.418	12.719	18.086	25.145	34.911	49.232	71.878	111.676	193.842
14	4.600	8.197	12.216	17.089	23.281	31.488	42.881	59.612	86.079	132.582
15	4.543	8.012	11.806	16.296	21.845	28.955	38.415	51.572	70.907	101.499
16	4.494	7.856	11.465	15.651	20.706	27.008	35.117	45.932	60.986	83.121
17	4.451	7.722	11.177	15.117	19.782	25.467	32.588	41.775	54.041	71.127
18	4.414	7.606	10.931	14.667	19.017	24.219	30.590	38.592	48.930	62.746
19	4.381	7.504	10.719	14.283	18.375	23.189	28.975	36.082	45.023	56.587
20	4.351	7.415	10.533	13.952	17.828	22.324	27.642	34.054	41.946	51.884
21	4.325	7.335	10.370	13.663	17.356	21.588	26.525	32.384	39.463	48.184
22	4.301	7.264	10.225	13.409	16.945	20.954	25.576	30.985	37.419	45.202
23	4.279	7.200	10.095	13.184	16.585	20.403	24.759	29.798	35.709	42.750
24	4.260	7.142	9.979	12.983	16.265	19.920	24.049	28.777	34.258	40.699
25	4.242	7.089	9.874	12.803	15.981	19.492	23.427	27.891	33.013	38.961
26	4.225	7.041	9.779	12.641	15.726	19.112	22.878	27.114	31.932	37.469
27	4.210	6.997	9.692	12.493	15.496	18.770	22.388	26.428	30.985	36.176
28	4.196	6.957	9.612	12.359	15.287	18.463	21.950	25.818	30.149	35.043
29	4.183	6.919	9.539	12.236	15.097	18.184	21.555	25.272	29.407	34.044
30	4.171	6.885	9.471	12.123	14.924	17.931	21.198	24.781	28.742	33.156
35	4.121	6.744	9.200	11.674	14.240	16.944	19.823	22.913	26.252	29.881
40	4.085	6.642	9.005	11.356	13.762	16.264	18.890	21.668	24.624	27.783
45	4.057	6.564	8.859	11.118	13.409	15.767	18.217	20.781	23.477	26.326
50	4.034	6.503	8.744	10.934	13.138	15.388	17.709	20.117	22.627	25.256
55	4.016	6.454	8.652	10.787	12.923	15.090	17.311	19.600	21.972	24.437
60	4.001	6.413	8.577	10.668	12.748	14.850	16.992	19.188	21.451	23.790
70	3.978	6.350	8.460	10.484	12.482	14.485	16.510	18.571	20.676	22.834
80	3.960	6.303	8.375	10.350	12.289	14.222	16.165	18.130	20.127	22.162
90	3.947	6.267	8.309	10.248	12.142	14.022	15.905	17.801	19.718	21.663
100	3.936	6.239	8.257	10.167	12.027	13.867	15.702	17.544	19.401	21.279
110	3.927	6.216	8.215	10.102	11.934	13.741	15.540	17.340	19.149	20.973
120	3.920	6.196	8.181	10.048	11.858	13.639	15.407	17.172	18.943	20.725
150	3.904	6.155	8.105	9.931	11.693	13.417	15.121	16.814	18.504	20.196
200	3.888	6.113	8.031	9.817	11.531	13.202	14.845	16.469	18.083	19.692
400	3.865	6.052	7.922	9.650	11.297	12.890	14.447	15.975	17.484	18.976
1000	3.851	6.015	7.857	9.552	11.160	12.710	14.217	15.692	17.141	18.570
∞	3.841	5.991	7.815	9.488	11.070	12.592	14.067	15.507	16.919	18.307

(continued)