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LAMPIRAN

Lampiran 1. Data PDAM Tirta Je'ne'berang Kabupaten Gowa Tahun 2020

Hari ke-	Kekeruhan	Sisa Klor	Hari ke-	Kekeruhan	Sisa Klor
1	3,37	0,48	36	4,55	1,54
2	4,20	0,56	37	4,16	1,58
3	4,10	0,75	38	4,44	0,44
4	5,25	0,19	39	4,81	0,41
5	4,10	1,33	40	4,52	1,50
6	3,52	1,26	41	3,95	0,20
7	4,20	0,75	42	3,21	1,97
8	3,91	1,00	43	4,13	0,46
9	4,59	0,27	44	3,33	0,22
10	4,87	0,84	45	5,95	0,32
11	3,60	1,12	46	4,76	1,07
12	4,80	0,22	47	4,12	1,79
13	3,07	0,23	48	4,27	1,35
14	3,78	0,90	49	3,50	0,70
15	4,98	0,40	50	3,05	0,10
16	3,99	1,07	51	5,42	1,19
17	4,11	0,43	52	4,70	0,82
18	5,59	0,52	53	5,16	1,19
19	4,11	0,46	54	4,94	0,10
20	4,09	0,45	55	3,06	0,25
21	6,15	0,50	56	4,16	0,30
22	4,63	0,24	57	5,06	0,54
23	4,93	0,59	58	5,94	2,79
24	6,88	1,69	59	5,50	1,45
25	6,96	0,94	60	8,12	2,60
26	2,50	0,11	61	7,23	0,42
27	3,71	0,11	62	5,13	0,86
28	3,45	0,11	63	4,69	0,66
29	4,79	2,30	64	4,54	0,54
30	4,68	0,55	65	4,26	0,18
31	4,46	0,49	66	3,48	0,12
32	2,14	0,71	67	4,48	0,53
33	3,71	1,39	68	3,33	0,86
34	5,14	0,30	69	4,23	0,66
35	3,17	0,14	70	2,97	0,21

Lampiran 1. Data PDAM Tirta Je'ne'berang Kabupaten Gowa Tahun 2020 (Lanjutan)

Hari ke-	Kekeruhan	Sisa Klor	Hari ke-	Kekeruhan	Sisa Klor
71	5,08	0,27	108	3,81	1,32
72	4,24	0,40	109	4,68	0,97
73	4,24	0,40	110	3,79	0,22
74	2,39	0,95	111	5,15	1,91
75	4,20	1,88	112	4,91	0,96
76	3,99	1,12	113	4,29	1,1
77	4,52	0,41	114	4,38	1,51
78	4,95	1,51	115	3,87	0,81
79	3,90	1,17	116	4,08	0,39
80	4,08	0,40	117	4,97	1,17
81	4,96	0,14	118	5,76	1,02
82	4,18	0,85	119	6,41	0,47
83	3,62	0,91	120	5,51	0,57
84	3,43	0,11	121	5,50	0,46
85	2,01	0,11	122	5,85	0,47
86	3,34	1,14	123	5,90	0,31
87	3,51	0,97	124	5,26	1,91
88	3,10	2,42	125	4,50	0,43
89	4,15	0,38	126	3,10	0,62
90	4,06	0,17	127	4,28	0,52
91	4,11	0,68	128	4,64	1,47
92	1,27	0,18	129	5,15	1,00
93	2,95	0,40	130	5,78	0,95
94	3,80	0,46	131	3,82	0,78
95	1,41	0,34	132	3,79	0,67
96	5,15	0,54	133	3,85	0,46
97	3,96	0,71	134	4,25	0,88
98	6,41	0,11	135	3,50	0,48
99	4,33	0,38	136	4,00	0,35
100	3,51	0,24	137	3,52	1,82
101	4,19	1,70	138	3,03	0,43
102	6,19	0,98	139	2,62	0,91
103	6,62	1,68	140	3,64	1,14
104	4,89	1,15	141	2,84	0,37
105	4,06	0,52	142	2,74	0,41
106	5,53	0,68	143	3,69	1,48
107	4,23	1,22	144	2,44	1,51

Lampiran 1. Data PDAM Tirta Je'ne'berang Kabupaten Gowa Tahun 2020 (Lanjutan)

Hari ke-	Kekeruhan	Sisa Klor	Hari ke-	Kekeruhan	Sisa Klor
145	2,39	1,37	182	2,58	1,10
146	2,67	0,69	183	3,22	0,31
147	2,29	0,50	184	3,51	0,30
148	3,13	0,52	185	1,92	0,14
149	3,60	0,99	186	2,80	0,24
150	2,26	0,92	187	2,17	0,40
151	2,65	0,40	188	1,85	0,15
152	3,75	0,82	189	2,13	0,38
153	2,93	0,52	190	1,54	0,22
154	2,29	0,49	191	1,76	0,21
155	2,40	0,18	192	1,61	0,20
156	3,19	0,16	193	1,57	1,23
157	3,15	0,17	194	1,58	0,44
158	3,17	1,17	195	2,16	0,18
159	3,72	0,71	196	1,39	0,18
160	3,93	0,88	197	1,50	0,20
161	3,38	0,36	198	1,36	0,15
162	3,60	0,99	199	1,39	0,24
163	2,26	0,92	200	1,32	0,11
164	2,65	0,40	201	1,61	0,18
165	3,75	0,82	202	1,58	0,17
166	2,93	0,52	203	1,47	0,26
167	2,29	0,49	204	1,62	0,23
168	2,40	0,18	205	1,46	0,13
169	3,19	0,16	206	1,44	0,34
170	3,15	0,17	207	1,63	0,24
171	3,17	1,17	208	1,66	0,20
172	3,72	0,71	209	1,43	0,72
173	3,93	0,88	210	1,52	0,64
174	3,38	0,36	211	1,84	0,70
175	3,31	0,81	212	1,47	0,68
176	2,78	0,39	213	1,47	0,13
177	2,81	0,14	214	1,40	0,43
178	3,51	0,40	215	1,59	0,14
179	3,25	1,10	216	4,38	0,23
180	3,89	1,38	217	4,70	0,57
181	1,96	2,41	218	5,65	0,57

Lampiran 1. Data PDAM Tirta Je'ne'berang Kabupaten Gowa Tahun 2020 (Lanjutan)

Hari ke-	Kekeruhan	Sisa Klor	Hari ke-	Kekeruhan	Sisa Klor
219	5,16	0,19	256	2,83	1,10
220	4,68	0,19	257	2,60	0,22
221	2,99	0,37	258	3,50	0,37
222	2,32	0,15	259	2,36	0,32
223	1,90	0,19	260	3,12	0,55
224	2,01	0,11	261	4,49	0,21
225	2,81	1,21	262	2,75	0,43
226	1,96	0,18	263	3,69	0,32
227	2,15	0,49	264	4,22	1,16
228	2,18	0,68	265	4,38	0,61
229	2,30	0,91	266	3,97	0,73
230	1,83	0,72	267	3,72	0,91
231	1,81	0,69	268	2,61	0,93
232	2,31	0,68	269	1,58	0,80
233	2,20	0,18	270	3,72	0,22
234	2,50	0,93	271	3,71	0,10
235	3,02	0,97	272	2,82	2,20
236	1,88	0,85	273	3,68	0,18
237	2,20	0,75	274	4,52	0,41
238	1,97	0,33	275	4,67	0,41
239	1,53	0,69	276	5,67	0,25
240	2,45	0,70	277	4,55	0,15
241	2,31	0,84	278	4,04	0,25
242	2,85	0,33	279	4,92	0,24
243	2,86	0,83	280	4,79	0,42
244	3,41	0,91	281	4,44	0,37
245	3,02	1,10	282	5,07	0,18
246	2,40	0,96	283	4,46	1,18
247	2,55	0,96			
248	3,50	0,77			
249	4,29	1,41			
250	4,45	1,09			
251	1,99	1,00			
252	3,84	0,78			
253	2,55	0,91			
254	3,85	1,15			
255	5,20	0,92			

Lampiran 2. Hasil Pengujian Normalitas

Pengamatan ke-	d_i^2	q_i	Pengamatan ke-	d_i^2	q_i
1	0,0093837	0,0035367	37	0,3244190	0,2761698
2	0,0097002	0,0106289	38	0,3496328	0,2842999
3	0,0097002	0,0177463	39	0,3511830	0,2924632
4	0,0252213	0,0248892	40	0,3771214	0,3006599
5	0,0469019	0,0320577	41	0,3865832	0,3088904
6	0,0532951	0,0392519	42	0,4002228	0,3171548
7	0,0574562	0,0464722	43	0,4002228	0,3254536
8	0,0768615	0,0537185	44	0,4040173	0,3337870
9	0,0775416	0,0609913	45	0,4040303	0,3421552
10	0,0775416	0,0682906	46	0,4040303	0,3505585
11	0,0815055	0,0756166	47	0,4450344	0,3589974
12	0,0864638	0,0829695	48	0,4536266	0,3674720
13	0,1481202	0,0903496	49	0,4654953	0,3759826
14	0,1492213	0,0977570	50	0,4722186	0,3845296
15	0,1543700	0,1051920	51	0,4817700	0,3931133
16	0,1592704	0,1126547	52	0,4824076	0,4017340
17	0,1643258	0,1201453	53	0,4946267	0,4103921
18	0,1649100	0,1276641	54	0,5325704	0,4190877
19	0,1653347	0,1352113	55	0,5379076	0,4278214
20	0,1794860	0,1427871	56	0,5419791	0,4365933
21	0,1794860	0,1503916	57	0,5506738	0,4454039
22	0,1849201	0,1580252	58	0,5548036	0,4542535
23	0,1882105	0,1656881	59	0,5724621	0,4631424
24	0,2056607	0,1733804	60	0,5799946	0,4720710
25	0,2130913	0,1811024	61	0,5800174	0,4810396
26	0,2160994	0,1888544	62	0,5802766	0,4900486
27	0,2210574	0,1966365	63	0,5861433	0,4990984
28	0,2500409	0,2044490	64	0,5919367	0,5081893
29	0,2646366	0,2122921	65	0,6028032	0,5173218
30	0,2681404	0,2201661	66	0,6200183	0,5264961
31	0,2792481	0,2280713	67	0,6514158	0,5357127
32	0,2917390	0,2360078	68	0,6737646	0,5449720
33	0,3020474	0,2439760	69	0,6777167	0,5542743
34	0,3020474	0,2519760	70	0,6777167	0,5636201
35	0,3058066	0,2600081	71	0,6989318	0,5730098
36	0,3156882	0,2680726	72	0,7044544	0,5824438

Lampiran 2. Hasil Pengujian Normalitas (Lanjutan)

Pengamatan ke-	d_i^2	q_i	Pengamatan ke-	d_i^2	q_i
73	0,7124185	0,5919225	109	1,0285033	0,9670443
74	0,7183893	0,6014463	110	1,0285033	0,9785386
75	0,7434488	0,6110157	111	1,0308672	0,9900993
76	0,7434488	0,6206311	112	1,0308672	1,0017273
77	0,7555465	0,6302930	113	1,0523304	1,0134232
78	0,7600211	0,6400017	114	1,0556588	1,0251879
79	0,7608818	0,6497578	115	1,0556588	1,0370223
80	0,7684372	0,6595618	116	1,0634290	1,0489271
81	0,7740173	0,6694140	117	1,0662319	1,0609032
82	0,7887124	0,6793150	118	1,0662319	1,0729514
83	0,7937499	0,6892653	119	1,0743203	1,0850727
84	0,8081529	0,6992653	120	1,0883295	1,0972678
85	0,8255130	0,7093156	121	1,0924149	1,1095378
86	0,8304326	0,7194166	122	1,1048186	1,1218835
87	0,8338470	0,7295689	123	1,1059461	1,1343059
88	0,8570634	0,7397730	124	1,1206139	1,1468060
89	0,8623436	0,7500295	125	1,1365091	1,1593846
90	0,8630857	0,7603388	126	1,1429509	1,1720429
91	0,8656734	0,7707015	127	1,1499925	1,1847818
92	0,8690256	0,7811182	128	1,1505426	1,1976023
93	0,9041488	0,7915894	129	1,1542350	1,2105056
94	0,9217050	0,8021157	130	1,1832851	1,2234927
95	0,9242121	0,8126978	131	1,1918872	1,2365646
96	0,9308056	0,8233361	132	1,2505763	1,2497225
97	0,9325686	0,8340313	133	1,2570169	1,2629676
98	0,9360353	0,8447840	134	1,2578354	1,2763010
99	0,9374665	0,8555949	135	1,2635288	1,2897239
100	0,9487734	0,8664645	136	1,2714778	1,3032374
101	0,9550590	0,8773934	137	1,2742826	1,3168429
102	0,9571763	0,8883825	138	1,2752845	1,3305416
103	0,9689629	0,8994322	139	1,2790795	1,3443348
104	0,9889892	0,9105434	140	1,2871137	1,3582237
105	0,9897933	0,9217166	141	1,2973518	1,3722098
106	1,0171095	0,9329526	142	1,2973518	1,3862944
107	1,0239338	0,9442520	143	1,3058570	1,4004788
108	1,0270099	0,9556157	144	1,3114554	1,4147646

Lampiran 2. Hasil Pengujian Normalitas (Lanjutan)

Pengamatan ke-	d_i^2	q_i	Pengamatan ke-	d_i^2	q_i
145	1,3324646	1,4291531	181	1,7834047	2,0311682
146	1,3394758	1,4436460	182	1,7879926	2,0507762
147	1,3422080	1,4582446	183	1,7903071	2,0705783
148	1,3751352	1,4729505	184	1,8659660	2,0905785
149	1,3838415	1,4877654	185	1,8729651	2,1107807
150	1,3858884	1,5026908	186	1,9215768	2,1311890
151	1,3886542	1,5177285	187	1,9318067	2,1518078
152	1,4296627	1,5328801	188	1,9577103	2,1726413
153	1,4303388	1,5481473	189	1,9907981	2,1936941
154	1,4459360	1,5635320	190	2,0424405	2,2149709
155	1,4492717	1,5790360	191	2,0480396	2,2364765
156	1,4582778	1,5946611	192	2,0505592	2,2582159
157	1,4582778	1,6104092	193	2,0633198	2,2801941
158	1,4658041	1,6262823	194	2,1063520	2,3024165
159	1,4796411	1,6422824	195	2,1375240	2,3248887
160	1,5049177	1,6584115	196	2,1823964	2,3476162
161	1,5133172	1,6746717	197	2,1997157	2,3706050
162	1,5205056	1,6910653	198	2,2033272	2,3938610
163	1,5310165	1,7075943	199	2,2033272	2,4173907
164	1,5372502	1,7242611	200	2,2380025	2,4412005
165	1,5381754	1,7410679	201	2,2487549	2,4652972
166	1,5409359	1,7580171	202	2,2724483	2,4896878
167	1,6050448	1,7751112	203	2,3385658	2,5143794
168	1,6079994	1,7923527	204	2,3435650	2,5393798
169	1,6098304	1,8097441	205	2,3612655	2,5646965
170	1,6261580	1,8272881	206	2,4025745	2,5903379
171	1,6274471	1,8449874	207	2,4126628	2,6163123
172	1,6464766	1,8628446	208	2,4164840	2,6426285
173	1,6464766	1,8808628	209	2,5013054	2,6692955
174	1,6476257	1,8990447	210	2,5404930	2,6963230
175	1,6512668	1,9173934	211	2,5419527	2,7237207
176	1,6744584	1,9359121	212	2,5667322	2,7514989
177	1,7028988	1,9546038	213	2,5825184	2,7796684
178	1,7166205	1,9734719	214	2,6039533	2,8082403
179	1,7556176	1,9925197	215	2,6079802	2,8372263
180	1,7579026	2,0117506	216	2,6111846	2,8666386

Lampiran 2. Hasil Pengujian Normalitas (Lanjutan)

Pengamatan ke-	d_i^2	q_i	Pengamatan ke-	d_i^2	q_i
217	2,6226763	2,8964899	253	3,5059147	4,4554404
218	2,6708460	2,9267935	254	3,5337601	4,5221133
219	2,6742644	2,9575633	255	3,5614341	4,5910856
220	2,7140451	2,9888140	256	3,6222555	4,6625218
221	2,7197089	3,0205607	257	3,7950344	4,7366043
222	2,7226756	3,0528194	258	3,9698092	4,8135369
223	2,7289348	3,0856071	259	4,0695970	4,8935476
224	2,7776024	3,1189412	260	4,2482998	4,9768930
225	2,8086277	3,1528403	261	4,5470856	5,0638632
226	2,8184257	3,1873239	262	4,6465172	5,1547879
227	2,8188186	3,2224125	263	4,6499842	5,2500440
228	2,8206016	3,2581278	264	4,7623181	5,3500649
229	2,8456199	3,2944924	265	4,8143727	5,4553523
230	2,8468820	3,3315305	266	4,8448253	5,5664920
231	2,8598636	3,3692675	267	5,5244286	5,6841730
232	2,8629255	3,4077302	268	5,6528079	5,8092137
233	2,8690275	3,4469471	269	5,6895204	5,9425965
234	2,8706537	3,4869485	270	6,2511016	6,0855144
235	2,8882750	3,5277662	271	6,3605841	6,2394365
236	2,8945964	3,5694344	272	6,6969657	6,4061997
237	2,9062236	3,6119892	273	7,4163228	6,5881433
238	2,9110423	3,6554691	274	7,4926511	6,7883102
239	2,9784053	3,6999154	275	7,7261799	7,0107615
240	3,0226954	3,7453719	276	8,2909576	7,2610878
241	3,0454533	3,7918856	277	9,4326581	7,5472894
242	3,0591454	3,8395069	278	10,2695495	7,8813976
243	3,0863444	3,8882898	279	11,0680493	8,2827390
244	3,0926908	3,9382925	280	13,5830831	8,7853679
245	3,1566454	3,9895773	281	16,6425129	9,4583123
246	3,1644270	4,0422119	282	17,9668609	10,4799636
247	3,1790302	4,0962693	283	21,0687667	12,6771882
248	3,2014318	4,1518284			
249	3,2117114	4,2089751			
250	3,2130760	4,2678029			
251	3,3568090	4,3284136			
252	3,4217415	4,3909187			

Lampiran 3. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase I

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
1	0,763	0	0,763	0	0	0	0,763
2	0,989	0	0,989	0	0	0	0,989
3	1,538	0	1,538	0	0	0	1,538
4	0,475	0	0,475	0	0	0	0,475
5	1,774	0	1,774	0	0	0	1,774
6	3,430	0	3,430	0	0	0	3,430
7	3,902	0	3,902	0	0	0	3,902
8	4,921	0	4,921	0	0	0	4,921
9	4,471	0	4,471	0	0	0	4,471
10	4,542	0	4,542	0	0	0	4,542
11	5,955	0	5,955	0	0	0	5,955
12	5,278	0	5,278	0	0	0	5,278
13	5,949	0	5,949	0	0	0	5,949
14	6,939	0	6,939	0	0	0	6,939
15	6,356	0	6,356	0	0	0	6,356
16	7,404	0	7,404	0	0	0	7,404
17	7,531	0	7,531	0	0	0	7,531
18	6,633	0	6,633	0	0	0	6,633
19	6,799	0	6,799	0	0	0	6,799
20	6,967	0	6,967	0	0	0	6,967
21	5,611	0	5,611	0	0	0	5,611
22	5,091	0	5,091	0	0	0	5,091
23	4,793	0	4,793	0	0	0	4,793
24	4,413	0	4,413	0	0	0	4,413
25	3,001	0	3,001	0	0	0	3,001
26	3,956	0	3,956	0	0	0	3,956
27	3,978	0	3,978	0	0	0	3,978
28	4,201	0	4,201	0	0	0	4,201
29	6,222	0	6,222	0	0	0	6,222
30	6,065	0	6,065	0	0	0	6,065
31	6,000	0	6,000	0	0	0	6,000
32	8,009	0	8,009	0	0	0	8,009
33	9,687	0	9,687	0	0	0	9,687
34	8,851	0	8,851	0	0	0	8,851
35	9,328	0	9,328	0	0	0	9,328
36	10,552	0	10,552	0	0	0	10,552
37	12,128	0	12,128	0	0	0	12,128
38	12,014	0	12,014	0	0	0	12,014
39	11,575	0	11,575	0	0	0	11,575
40	12,770	0	12,770	0	0	0	12,770
41	12,723	0	12,723	0	0	0	12,723
42	15,537	0	15,537	0	0	0	15,537
43	15,688	0	15,688	0	0	0	15,688
44	16,145	0	16,145	0	0	0	16,145
45	14,710	0	14,710	0	0	0	14,710
46	15,164	0	15,164	0	0	0	15,164
47	17,043	0	17,043	0	0	0	17,043

Lampiran 3. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase I (Lanjutan)

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
48	18,237	0	18,237	0	0	0	18,237
49	19,184	0	19,184	0	0	0	19,184
50	19,702	0	19,702	0	0	0	19,702
51	19,802	0	19,802	0	0	0	19,802
52	19,978	0	19,978	0	0	0	19,978
53	20,278	0	20,278	0	0	0	20,278
54	19,338	0	19,338	0	0	0	19,338
55	20,043	0	20,043	0	0	0	20,043
56	19,963	0	19,963	0	0	0	19,963
57	19,500	0	19,500	0	0	0	19,500
58	21,268	0	21,268	0	0	0	21,268
59	21,642	0	21,642	0	0	0	21,642
60	21,483	0	21,483	0	0	0	21,483
61	19,190	0	19,190	0	0	0	19,190
62	19,087	0	19,087	0	0	0	19,087
63	19,064	0	19,064	0	0	0	19,064
64	19,002	0	19,002	0	0	0	19,002
65	18,690	0	18,690	0	0	0	18,690
66	18,902	0	18,902	0	0	0	18,902
67	18,873	0	18,873	0	0	0	18,873
68	20,158	0	20,158	0	0	0	20,158
69	20,490	0	20,490	0	0	0	20,490
70	21,212	0	21,212	0	0	0	21,212
71	20,384	0	20,384	0	0	0	20,384
72	20,372	0	20,372	0	0	0	20,372
73	20,360	0	20,360	0	0	0	20,360
74	22,487	0	22,487	0	0	0	22,487
75	24,421	0	24,421	0	0	0	24,421
76	25,533	0	25,533	0	0	0	25,533
77	25,318	0	25,318	0	0	0	25,318
78	26,195	0	26,195	0	0	0	26,195
79	27,441	0	27,441	0	0	0	27,441
80	27,553	0	27,553	0	0	0	27,553
81	26,649	0	26,649	0	0	0	26,649
82	27,265	0	27,265	0	0	0	27,265
83	28,391	0	28,391	0	0	0	28,391
84	28,629	0	28,629	0	0	0	28,629
85	29,963	0	29,963	0	0	0	29,963
86	31,602	0	31,602	0	0	0	31,602
87	32,891	0	32,891	0	0	0	32,891
88	36,372	0	36,372	0	0	0	36,372
89	36,403	0	36,403	0	0	0	36,403
90	36,233	0	36,233	0	0	0	36,233
91	36,683	0	36,683	0	0	0	36,683
92	38,678	0	38,678	0	0	0	38,678
93	39,661	0	39,661	0	0	0	39,661
94	40,067	0	40,067	0	0	0	40,067

Lampiran 3. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase I (Lanjutan)

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
95	42,160	0	42,160	0	0	0	42,160
96	41,627	0	41,627	0	0	0	41,627
97	42,233	0	42,233	0	0	0	42,233
98	40,171	0	40,171	0	0	0	40,171
99	40,064	0	40,064	0	0	0	40,064
100	40,408	0	40,408	0	0	0	40,408
101	42,117	0	42,117	0	0	0	42,117
102	41,351	0	41,351	0	0	0	41,351
103	41,158	0	41,158	0	0	0	41,158
104	41,615	0	41,615	0	0	0	41,615
105	41,898	0	41,898	0	0	0	41,898
106	41,253	0	41,253	0	0	0	41,253
107	42,309	0	42,309	0	0	0	42,309
108	43,819	0	43,819	0	0	0	43,819
109	44,205	0	44,205	0	0	0	44,205
110	44,308	0	44,308	0	0	0	44,308
111	45,547	0	45,547	0	0	0	45,547
112	45,743	0	45,743	0	0	0	45,743
113	46,598	0	46,598	0	0	0	46,598
114	47,914	0	47,914	0	0	0	47,914
115	48,718	0	48,718	0	0	0	48,718
116	48,816	0	48,816	0	0	0	48,816
117	49,237	0	49,237	0	0	0	49,237
118	48,855	0	48,855	0	0	0	48,855
119	47,259	0	47,259	0	0	0	47,259
120	46,487	0	46,487	0	0	0	46,487
121	45,581	0	45,581	0	0	0	45,581
122	44,418	0	44,418	0	0	0	44,418
123	43,008	0	43,008	0	0	0	43,008
124	44,163	0	44,163	0	0	0	44,163
125	43,989	0	43,989	0	0	0	43,989
126	45,142	0	45,142	0	0	0	45,142
127	45,254	0	45,254	0	0	0	45,254
128	46,318	0	46,318	0	0	0	46,318
129	46,380	0	46,380	0	0	0	46,380
130	45,891	0	45,891	0	0	0	45,891
131	46,695	0	46,695	0	0	0	46,695
132	47,380	0	47,380	0	0	0	47,380
133	47,746	0	47,746	0	0	0	47,746
134	48,347	0	48,347	0	0	0	48,347
135	49,010	0	49,010	0	0	0	49,010
136	49,118	0	49,118	0	0	0	49,118
137	51,499	0	51,499	0	0	0	51,499
138	52,459	0	52,459	0	0	0	52,459
139	54,357	0	54,357	0	0	0	54,357
140	55,765	0	55,765	0	0	0	55,765
141	56,795	0	56,795	0	0	0	56,795

Lampiran 3. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase I (Lanjutan)

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
142	57,953	0	57,953	0	0	0	57,953
143	59,763	0	59,763	0	0	0	59,763
144	62,575	0	62,575	0	0	0	62,575
145	65,246	0	65,246	0	0	0	65,246
146	66,820	0	66,820	0	0	0	66,820
147	68,442	0	68,442	0	0	0	68,442
148	69,442	0	69,442	0	0	0	69,442

Lampiran 4. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase II

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
1	1,245	0	1,245	0,271	0	0,271	1,245
2	3,433	0	3,433	1,841	0	1,841	3,433
3	4,648	0	4,648	2,633	0	2,633	4,648
4	5,557	0	5,557	2,474	0	2,474	5,557
5	6,711	0	6,711	2,996	0	2,996	6,711
6	8,321	0	8,321	4,219	0	4,219	8,321
7	9,444	0	9,444	5,264	0	5,264	9,444
8	9,932	0	9,932	5,447	0	5,447	9,932
9	10,463	0	10,463	5,672	0	5,672	10,463
10	12,273	0	12,273	6,647	0	6,647	12,273
11	13,063	0	13,063	6,373	0	6,373	13,063
12	13,911	0	13,911	6,107	0	6,107	13,911
13	14,511	0	14,511	6,034	0	6,034	14,511
14	15,756	0	15,756	6,305	0	6,305	15,756
15	17,944	0	17,944	7,874	0	7,874	17,944
16	19,159	0	19,159	8,667	0	8,667	19,159
17	20,069	0	20,069	8,508	0	8,508	20,069
18	21,223	0	21,223	9,030	0	9,030	21,223
19	22,832	0	22,832	10,253	0	10,253	22,832
20	23,955	0	23,955	11,297	0	11,297	23,955
21	24,443	0	24,443	11,481	0	11,481	24,443
22	24,974	0	24,974	11,706	0	11,706	24,974
23	26,784	0	26,784	12,680	0	12,680	26,784
24	27,574	0	27,574	12,407	0	12,407	27,574
25	28,422	0	28,422	12,141	0	12,141	28,422
26	29,022	0	29,022	12,068	0	12,068	29,022
27	30,258	0	30,258	12,400	0	12,400	30,258
28	31,360	0	31,360	13,042	0	13,042	31,360
29	32,115	0	32,115	13,652	0	13,652	32,115
30	32,666	0	32,666	13,421	0	13,421	32,666
31	34,323	0	34,323	14,213	0	14,213	34,323
32	35,849	0	35,849	14,940	0	14,940	35,849
33	40,196	0	40,196	18,852	0	18,852	40,196
34	42,370	0	42,370	20,300	0	20,300	42,370
35	43,028	0	43,028	20,419	0	20,419	43,028
36	43,450	0	43,450	20,186	0	20,186	43,450
37	44,891	0	44,891	21,737	0	21,737	44,891
38	45,783	0	45,783	22,341	0	22,341	45,783
39	47,369	0	47,369	23,661	0	23,661	47,369
40	48,877	0	48,877	25,284	0	25,284	48,877
41	50,467	0	50,467	26,641	0	26,641	50,467
42	52,305	0	52,305	28,588	0	28,588	52,305
43	53,960	0	53,960	30,306	0	30,306	53,960
44	55,718	0	55,718	32,178	0	32,178	55,718
45	58,840	0	58,840	34,752	0	34,752	58,840
46	60,932	0	60,932	36,709	0	36,709	60,932
47	62,240	0	62,240	38,008	0	38,008	62,240

Lampiran 4. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase II (Lanjutan)

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
48	64,142	0	64,142	40,105	0	40,105	64,142
49	65,985	0	65,985	42,090	0	42,090	65,985
50	67,872	0	67,872	44,216	0	44,216	67,872
51	69,852	0	69,852	46,319	0	46,319	69,852
52	71,718	0	71,718	48,483	0	48,483	71,718
53	73,450	0	73,450	50,355	0	50,355	73,450
54	75,193	0	75,193	52,256	0	52,256	75,193
55	77,137	0	77,137	54,280	0	54,280	77,137
56	78,926	0	78,926	56,145	0	56,145	78,926
57	80,709	0	80,709	58,168	0	58,168	80,709
58	82,780	0	82,780	60,240	0	60,240	82,780
59	84,575	0	84,575	62,096	0	62,096	84,575
60	86,295	0	86,295	63,917	0	63,917	86,295
61	88,866	0	88,866	66,175	0	66,175	88,866
62	91,263	0	91,263	68,290	0	68,290	91,263
63	93,491	0	93,491	70,112	0	70,112	93,491
64	95,978	0	95,978	72,303	0	72,303	95,978
65	97,754	0	97,754	74,316	0	74,316	97,754
66	99,972	0	99,972	76,456	0	76,456	99,972
67	101,668	0	101,668	78,347	0	78,347	101,668
68	101,328	0	101,328	77,040	0	77,040	101,328
69	101,181	0	101,181	74,948	0	74,948	101,181
70	100,301	0	100,301	73,471	0	73,471	100,301
71	99,308	0	99,308	72,055	0	72,055	99,308
72	98,686	0	98,686	70,569	0	70,569	98,686
73	99,600	0	99,600	70,966	0	70,966	99,600
74	100,746	0	100,746	72,098	0	72,098	100,746
75	102,268	0	102,268	73,670	0	73,670	102,268
76	103,601	0	103,601	75,130	0	75,130	103,601
77	105,740	0	105,740	76,502	0	76,502	105,740
78	107,202	0	107,202	78,011	0	78,011	107,202
79	108,919	0	108,919	79,386	0	79,386	108,919
80	110,858	0	110,858	80,836	0	80,836	110,858
81	113,002	0	113,002	82,355	0	82,355	113,002
82	115,263	0	115,263	84,201	0	84,201	115,263
83	117,502	0	117,502	86,047	0	86,047	117,502
84	119,341	0	119,341	87,359	0	87,359	119,341
85	120,618	0	120,618	88,616	0	88,616	120,618
86	122,634	0	122,634	89,949	0	89,949	122,634
87	124,301	0	124,301	90,791	0	90,791	124,301
88	126,692	0	126,692	92,685	0	92,685	126,692
89	128,707	0	128,707	94,167	0	94,167	128,707
90	130,356	0	130,356	95,682	0	95,682	130,356
91	132,810	0	132,810	97,817	0	97,817	132,810
92	134,567	0	134,567	98,993	0	98,993	134,567
93	136,613	0	136,613	100,435	0	100,435	136,613
94	137,584	0	137,584	100,986	0	100,986	137,584

Lampiran 4. Nilai C_i^+ , C_i^- , C_i , S_i^+ , S_i^- , S_i dan M_i Fase II (Lanjutan)

No.	C_i^+	C_i^-	C_i	S_i^+	S_i^-	S_i	M_i
95	139,193	0	139,193	101,835	0	101,835	139,193
96	140,481	0	140,481	102,187	0	102,187	140,481
97	142,316	0	142,316	103,203	0	103,203	142,316
98	144,448	0	144,448	104,670	0	104,670	144,448
99	146,464	0	146,464	105,984	0	105,984	146,464
100	147,502	0	147,502	106,050	0	106,050	147,502
101	148,758	0	148,758	106,568	0	106,568	148,758
102	149,477	0	149,477	106,251	0	106,251	149,477
103	151,977	0	151,977	108,173	0	108,173	151,977
104	152,765	0	152,765	107,848	0	107,848	152,765
105	154,718	0	154,718	109,108	0	109,108	154,718
106	155,977	0	155,977	109,421	0	109,421	155,977
107	155,897	0	155,897	108,261	0	108,261	155,897
108	157,878	0	157,878	109,464	0	109,464	157,878
109	158,898	0	158,898	110,290	0	110,290	158,898
110	159,418	0	159,418	110,068	0	110,068	159,418
111	160,753	0	160,753	111,162	0	111,162	160,753
112	161,799	0	161,799	111,478	0	111,478	161,799
113	161,348	0	161,348	110,091	0	110,091	161,348
114	162,524	0	162,524	110,780	0	110,780	162,524
115	162,833	0	162,833	110,314	0	110,314	162,833
116	163,821	0	163,821	110,335	0	110,335	163,821
117	163,973	0	163,973	108,976	0	108,976	163,973
118	164,596	0	164,596	108,413	0	108,413	164,596
119	165,645	0	165,645	108,428	0	108,428	165,645
120	167,576	0	167,576	109,648	0	109,648	167,576
121	170,134	0	170,134	111,809	0	111,809	170,134
122	170,290	0	170,290	111,343	0	111,343	170,290
123	170,299	0	170,299	110,987	0	110,987	170,299
124	173,711	0	173,711	113,955	0	113,955	173,711
125	173,846	0	173,846	113,564	0	113,564	173,846
126	173,631	0	173,631	111,761	0	111,761	173,631
127	173,301	0	173,301	109,625	0	109,625	173,301
128	171,992	0	171,992	108,625	0	108,625	171,992
129	171,417	0	171,417	107,344	0	107,344	171,417
130	171,365	0	171,365	106,449	0	106,449	171,365
131	170,621	0	170,621	104,712	0	104,712	170,621
132	170,211	0	170,211	102,248	0	102,248	170,211
133	170,006	0	170,006	100,635	0	100,635	170,006
134	169,069	0	169,069	99,192	0	99,192	169,069
135	169,896	0	169,896	99,083	0	99,083	169,896

Lampiran 5. Nilai Average Run Length (ARL)

h	63,8	100	120	121	121,5
	<i>Run Length (RL)</i>				
1	164	290	373	416	404
2	214	294	444	389	353
3	204	284	306	295	409
4	292	221	361	325	414
5	357	285	347	445	407
⋮	⋮	⋮	⋮	⋮	⋮
96	178	328	429	251	369
97	191	250	394	385	323
98	216	331	364	330	392
99	182	254	356	512	474
100	219	198	409	301	334
ARL	195,66	302,76	363,67	369,91	370,31

Lampiran 6. Program R Peta Kendali *Maximum Multivariate Cumulative Sum*

```

#Input Data
library(readxl)
Data = read_excel("Data/ Data Fase I.xlsx")
View(Data)
Dataskripsi=data.frame(Data)

#myuG
myug=c(5,0.5)
myug.matrix=as.matrix(myug)

#myuB
X1=(Dataskripsi[1:148,1])
X1mean=round(mean(X1),digits = 3)
X2=(Dataskripsi[1:148,2])
X2mean=round(mean(X2),digits = 3)

myub=c(X1mean,X2mean)
myub.matrix=as.matrix(myub)

#myuB-myug
mbkmy=myub.matrix-myug.matrix

#Matriks Varians-Kovarian
X=cov(Dataskripsi)

#Invers Matriks Varians-Kovarian
inversX=solve(X)

#Menghitung a transpose
pembilang_a=t(mbkmy)%*%inversX
penyebut_a=sqrt(pembilang_a%*%mbkmy)
penyebut_aa=c(penyebut_a,penyebut_a)
a_transpose=pembilang_a/penyebut_aa

#Menghitung k
pembilang_k=pembilang_a%*%mbkmy
k=0.5*(pembilang_k/penyebut_a)

#Menghitung Lambda
lambda=sqrt(pembilang_a%*%mbkmy)

#Menghitung Xi-myug
matrix_myug1=matrix(myug.matrix[1],148,1)
X1_myug=Dataskripsi[1:148,1]-matrix_myug1
matrix_myug2=matrix(myug.matrix[2],148,1)
X2_myug=Dataskripsi[1:148,2]-matrix_myug2
Xi_myug=as.matrix(cbind(X1_myug,X2_myug))

#Menghitung Zi
Zi=matrix(ncol=1,nrow=148)

```

Lampiran 6. Program R Peta Kendali *Maximum Multivariate Cumulative Sum* (Lanjutan)

```

for(i in 1:148){
  Zi[i]=round(a_transpose**Xi_myug[i,],digits = 3)
}
Zi

#Menghitung Yi
W=inversX**t(Xi_myug)
WW=matrix(ncol=1,nrow=148)
for (i in 1:148)
  WW[i]=Xi_myug[i,]**W[,i]
}
WW
H=pchisq(WW,2,ncp=0,log=FALSE)
Yi=qnorm(H)

#UCL
UCL=as.matrix(rep(121.5,148))

#Menghitung Ci
Ci_plus=matrix(ncol=2,nrow=148)
C0_plus=c(0)
Ci_plus[1,1]=Zi[1,]-k+C0_plus
Ci_plus[1,2]=max(Ci_plus[1,1],C0_plus)
for (i in 1:147){
  Ci_plus[i+1,1]=Zi[i+1,]-k+Ci_plus[i,1]
  Ci_plus[i+1,2]=max(Ci_plus[i+1,1],C0_plus)
}
Ci_plus

Ci_min=matrix(ncol=2,nrow=148)
C0_min=c(0)
Ci_min[1,1]=-k-Zi[1,]+C0_min
Ci_min[1,2]=max(Ci_min[1,1],C0_min)
for (i in 1:147){
  Ci_min[i+1,1]=-k-Zi[i+1,]+Ci_min[i,1]
  Ci_min[i+1,2]=max(Ci_min[i+1,1],C0_min)
}
Ci_min

Ci=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Ci[i]=max(Ci_plus[i,2],Ci_min[i,2])
}
Ci

#Menghitung Si
Si_plus=matrix(ncol=2,nrow=148)
S0_plus=c(0)
Si_plus[1,1]=Yi[1,]-k+S0_plus
Si_plus[1,2]=max(Si_plus[1,1],S0_plus)

```

Lampiran 6. Program R Peta Kendali *Maximum Multivariate Cumulative Sum* (Lanjutan)

```

for (i in 1:147){
  Si_plus[i+1,1]=Yi[i+1,]-k+Si_plus[i,1]
  Si_plus[i+1,2]=max(Si_plus[i+1,1],S0_plus)
}
Si_plus

Si_min=matrix(ncol=2,nrow=148)
S0_min=c(0)
Si_min[1,1]=-k-Yi[1,]+S0_min
Si_min[1,2]=max(Si_min[1,1],S0_min)
for (i in 1:147){
  Si_min[i+1,1]=-k-Yi[i+1,]+Si_min[i,1]
  Si_min[i+1,2]=max(Si_min[i+1,1],S0_min)
}
Si_min

Si=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Si[i]=max(Si_plus[i,2],Si_min[i,2])
}
Si

#Menghitung Mi
Mi=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Mi[i]=max(Ci[i],Si[i])
}
Mi

Mi_akhir=as.matrix(Mi)
round(Mi_akhir,digits=3)

#Plot Peta Kendali
library(plotly)
Pengamatan=as.matrix(c(1:nrow(Mi_akhir)))
dataplot=as.data.frame(cbind(Pengamatan,round(Mi_akhir,
digits=3),UCL))
colnames(dataplot)=c("Pengamatan","Mi","UCL")

t=list(family="Arial",size=18,color="black")
t2=list(family="Arial",size=15,color="black")
plot_ly(dataplot, x = ~Pengamatan, mode="lines+markers") %>%
layout(title=list(text="Peta Kendali Max-MCUSUM Fase I",
font=t),xaxis=list(title=list(text="Pengamatan",font=t2)),
yaxis=list(title=list(text="Mi",font=t2)))%>%
add_lines(y=~Mi,color=I("medium slate blue"),name="Garis
Mi")%>%add_markers(y=~Mi,color=I("royal blue"),name="Titik
Mi",marker=list(size=5))%>%add_lines(y=~UCL,name="UCL",color=I(
"red"))

```

Lampiran 7. Program R Penentuan Batas Kendali Atas

```

#Input Data
library(readxl)
Data = read_excel("Data/Data Fase I.xlsx")
View(Data)
Dataskripsi=data.frame(Data)

#myuG
myug=c(5,0.5)
myug.matrix=as.matrix(myug)

#myuB
X1=(Dataskripsi[1:148,1])
X1mean=round(mean(X1),digits = 3)
X2=(Dataskripsi[1:148,2])
X2mean=round(mean(X2),digits = 3)

myub=c(X1mean,X2mean)
myub.matrix=as.matrix(myub)

#myuB-myug
mbkmy=myub.matrix-myug.matrix

#Matriks Varians-Kovarian
X=cov(Dataskripsi)

#Invers Matriks Varians-Kovarian
inversX=solve(X)

#Menghitung a transpose
pembilang_a=t(mbkmy)%*%inversX
penyebut_a=sqrt(pembilang_a*%mbkmy)
penyebut_aa=c(penyebut_a,penyebut_a)
a_transpose=pembilang_a/penyebut_aa

#Menghitung k
k=0.5

#Menghitung Lambda
lambda=sqrt(pembilang_a*%mbkmy)

#Menghitung Xi-myug
matrix_myug1=matrix(myug.matrix[1],148,1)
X1_myug=Dataskripsi[1:148,1]-matrix_myug1
matrix_myug2=matrix(myug.matrix[2],148,1)
X2_myug=Dataskripsi[1:148,2]-matrix_myug2
Xi_myug=as.matrix(cbind(X1_myug,X2_myug))

#Menghitung Zi
Zi=matrix(ncol=1,nrow=148)
for(i in 1:148){

```

Lampiran 7. Program R Penentuan Batas Kendali Atas (Lanjutan)

```

Zi[i]=round(a_transpose%*%Xi_myug[i,],digits = 3)
}
Zi

#Menghitung Yi
W=inversX%*%t(Xi_myug)
WW=matrix(ncol=1,nrow=148)
for (i in 1:148){
  WW[i]=Xi_myug[i,]%*%W[,i]
}
WW
H=pchisq(WW,2,ncp=0,log=FALSE)
Yi=qnorm(H)

#Menghitung Ci plus
Ci_plus=matrix(ncol=2,nrow=148)
C0_plus=c(0)
Ci_plus[1,1]=Zi[1,]-k+C0_plus
Ci_plus[1,2]=max(Ci_plus[1,1],C0_plus)
for (i in 1:147){
  Ci_plus[i+1,1]=Zi[i+1,]-k+Ci_plus[i,1]
  Ci_plus[i+1,2]=max(Ci_plus[i+1,1],C0_plus)
}
Ci_plus

#Menghitung Ci minus
Ci_min=matrix(ncol=2,nrow=148)
C0_min=c(0)
Ci_min[1,1]=-k-Zi[1,]+C0_min
Ci_min[1,2]=max(Ci_min[1,1],C0_min)
for (i in 1:147){
  Ci_min[i+1,1]=-k-Zi[i+1,]+Ci_min[i,1]
  Ci_min[i+1,2]=max(Ci_min[i+1,1],C0_min)
}
Ci_min

#Menghitung Ci
Ci=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Ci[i]=max(Ci_plus[i,2],Ci_min[i,2])
}
Ci

#Menghitung Si plus
Si_plus=matrix(ncol=2,nrow=148)
S0_plus=c(0)
Si_plus[1,1]=Yi[1,]-k+S0_plus
Si_plus[1,2]=max(Si_plus[1,1],S0_plus)
for (i in 1:147){

```

Lampiran 7. Program R Penentuan Batas Kendali Atas (Lanjutan)

```

Si_plus[i+1,1]=Yi[i+1,]-k+Si_plus[i,1]
  Si_plus[i+1,2]=max(Si_plus[i+1,1],S0_plus)
}
Si_plus

#Menghitung Si minus
Si_min=matrix(ncol=2,nrow=148)
S0_min=c(0)
Si_min[1,1]=-k-Yi[1,]+S0_min
Si_min[1,2]=max(Si_min[1,1],S0_min)
for (i in 1:147){
  Si_min[i+1,1]=-k-Yi[i+1,]+Si_min[i,1]
  Si_min[i+1,2]=max(Si_min[i+1,1],S0_min)
}
Si_min

#Menghitung Si
Si=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Si[i]=max(Si_plus[i,2],Si_min[i,2])
}
Si

#Menghitung Mi
Mi=matrix(ncol=1,nrow=148)
for(i in 1:148){
  Mi[i]=max(Ci[i],Si[i])
}
Mi

#Bootstrap UCL
n=length(Mi)
B=500
Mipersentil=vector()
for(i in 1:B){
  Mibootstrap=sample(Mi,n,replace=T)
  Mipersentil[i]=quantile(Mibootstrap,probs=(0.95))
}
Mipersentil
H=1/B*sum(Mipersentil)
UCL=H

```


Lampiran 8. Program R Simulasi Average Run Length

```

library(mvnormtest)
library(MASS)
S=matrix(c(1.2385431,0.1319759,0.1319759,0.3144364),nrow = 2,
ncol = 2)
mu=c(4.264,0.786)
RL=matrix(nrow=100,ncol=1)

for(j in 1:100){
  Bangkit=rmvnorm(1000, mean = mu, sigma = S)
  X1=sample(Bangkit[,1],1000)
  X2=sample(Bangkit[,2],1000)
  Data=cbind(X1,X2)
  Dataskripsi=data.frame(Data)

  #myuG
  myug=c(5,0.5)
  myug.matrix=as.matrix(myug)

  #myuB
  X1=(Dataskripsi[1:1000,1])
  X1mean=round(mean(X1),digits = 3)
  X2=(Dataskripsi[1:1000,2])
  X2mean=round(mean(X2),digits = 3)

  myub=c(X1mean,X2mean)
  myub.matrix=as.matrix(myub)

  #myuB-myug
  mbkmy=myub.matrix-myug.matrix

  #matriks varian kovarian
  X=cov(Dataskripsi)

  #invers matriks varian kovarian
  inversX=solve(X)

  #menghitung a transpose
  pembilang_a=t(mbkmy)%*%inversX
  penyebut_a=sqrt(pembilang_a%*%mbkmy)
  penyebut_aa=c(penyebut_a,penyebut_a)
  a_transpose=pembilang_a/penyebut_aa

  #menghitung k
  k=0.5

  #menghitung lambda
  lambda=sqrt(pembilang_a%*%mbkmy)

  #menghitung Xi-myug
  matrix_myug1=matrix(myug.matrix[1],1000,1)

```

Lampiran 8. Program R Simulasi Average Run Length (Lanjutan)

```

X1_myug=Dataskripsi[1:1000,1]-matrix_myug1
matrix_myug2=matrix(myug.matrix[2],1000,1)
X2_myug=Dataskripsi[1:1000,2]-matrix_myug2
Xi_myug=as.matrix(cbind(X1_myug,X2_myug))

#menghitung Zi=a_transpose(Xi-myug)
Zi=matrix(ncol=1,nrow=1000)
for(i in 1:1000){
  Zi[i]=round(a_transpose%%Xi_myug[i,],digits = 3)
}
Zi

#menghitung Yi
W=inversX%%t(Xi_myug)
WW=matrix(ncol=1,nrow=1000)
for (i in 1:1000){
  WW[i]=Xi_myug[i,]%%W[,i]
}
WW
H=pchisq(WW,2,ncp=0,log=FALSE)
Yi=qnorm(H)

#Menghitung Ci
Ci_plus=matrix(ncol=2,nrow=1000)
C0_plus=c(0)
Ci_plus[1,1]=Zi[1,]-k+C0_plus
Ci_plus[1,2]=max(Ci_plus[1,1],C0_plus)

for (i in 1:999){
  Ci_plus[i+1,1]=Zi[i+1,]-k+Ci_plus[i,1]
  Ci_plus[i+1,2]=max(Ci_plus[i+1,1],C0_plus)
}
Ci_plus

Ci_min=matrix(ncol=2,nrow=1000)
C0_min=c(0)
Ci_min[1,1]=-k-Zi[1,]+C0_min
Ci_min[1,2]=max(Ci_min[1,1],C0_min)

for (i in 1:999){
  Ci_min[i+1,1]=-k-Zi[i+1,]+Ci_min[i,1]
  Ci_min[i+1,2]=max(Ci_min[i+1,1],C0_min)
}
Ci_min

Ci=matrix(ncol=1,nrow=1000)
for(i in 1:1000){
  Ci[i]=max(Ci_plus[i,2],Ci_min[i,2])
}
Ci

```

Lampiran 8. Program R Simulasi Average Run Length (Lanjutan)

```

#Menghitung Si
Si_plus=matrix(ncol=2,nrow=1000)
S0_plus=c(0)
  Si_plus[1,1]=Yi[1,]-k+S0_plus
Si_plus[1,2]=max(Si_plus[1,1],S0_plus)

for (i in 1:999){
  Si_plus[i+1,1]=Yi[i+1,]-k+Si_plus[i,1]
  Si_plus[i+1,2]=max(Si_plus[i+1,1],S0_plus)
}
Si_plus

  Si_min=matrix(ncol=2,nrow=1000)
S0_min=c(0)
Si_min[1,1]=-k-Yi[1,]+S0_min
Si_min[1,2]=max(Si_min[1,1],S0_min)

for (i in 1:999){
  Si_min[i+1,1]=-k-Yi[i+1,]+Si_min[i,1]
  Si_min[i+1,2]=max(Si_min[i+1,1],S0_min)
}
Si_min

Si=matrix(ncol=1,nrow=1000)
for(i in 1:1000){
  Si[i]=max(Si_plus[i,2],Si_min[i,2])
}
Si

#menghitung Mi
Mi=matrix(ncol=1,nrow=1000)
for(i in 1:1000){
  Mi[i]=max(Ci[i],Si[i])
}
Mi

#RL
h=121.5
Mi_i=Mi<=h
control=sum(Mi_i,na.rm = TRUE)+1
RL[j]=control
}
RL
ARL=mean(RL)

```

Lampiran 9. Daftar Riwayat Hidup Peneliti**A. DATA PRIBADI**

Nama : Dania Nafila
NIM : H051201053
Tempat, Tanggal Lahir : Makassar, 27 Mei 2002
Agama : Islam
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B. RIWAYAT PENDIDIKAN

1. SD Inpres Paccerakkang (2008-2014)
2. SMPN 12 Makassar (2014-2017)
3. SMAN 5 Makassar (2017-2020)
4. S1 Program Studi Statistika FMIPA Unhas (2020-2024)