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LAMPIRAN

Lampiran 1. Data *Remaking* (Cacat) Produksi Butsudan PT. Maruki International Indonesia

Periode	*Remaking* (Cacat)	Periode	*Remaking* (Cacat)
Jan-17	25	Jan-20	41
Feb-17	22	Feb-20	43
Mar-17	20	Mar-20	35
Apr-17	18	Apr-20	44
Mei-17	29	Mei-20	19
Juni-17	23	Juni-20	22
Juli-17	20	Juli-20	39
Agust-17	23	Agust-20	35
Sep-17	27	Sep-20	32
Okt-17	30	Okt-20	28
Nov-17	29	Nov-20	31
Des-17	22	Des-20	18
Jan-18	21	Jan-21	28
Feb-18	35	Feb-21	44
Mar-18	21	Mar-21	31
Apr-18	27	Apr-21	19
Mei-18	20	Mei-21	17
Juni-18	19	Juni-21	25
Juli-18	33	Juli-21	19
Agust-18	26	Agust-21	22
Sep-18	28	Sep-21	27
Okt-18	25	Okt-21	26
Nov-18	20	Nov-21	16
Des-18	21	Des-21	19
Jan-19	29	Jan-22	13
Feb-19	26	Feb-22	30
Mar-19	37	Mar-22	27

Lampiran 1. Data *Remaking* (Cacat) Produksi Butsudan PT. Maruki International Indonesia (Lanjutan)

Periode	***Remaking* (Cacat)**	**Periode**	***Remaking* (Cacat)**
Apr-19	27	Apr-22	41
Mei-19	18	Mei-22	34
Juni-19	29	Juni-22	43
Juli-19	38	Juli-22	44
Agust-19	30	Agust-22	19
Sep-19	29	Sep-22	33
Okt-19	27	Okt-22	27
Nov-19	39	Nov-22	29
Des-19	31	Des-22	23

Lampiran 2. Hasil Perhitungan Uji Normalitas Kolmogorov-Smirnov

No	xi	F	Frekuensi Kumulatif	Sn(xi)	F0(xi)	|Sn(xi)-F0(xi)|
1	13	1	1	0,02893	0,01389	0,01504
2	14	0	1	0,03863	0,01389	0,02474
3	15	0	1	0,05083	0,01389	0,03694
4	16	1	2	0,06592	0,02778	0,03814
5	17	1	3	0,08426	0,04167	0,04260
6	18	3	6	0,10619	0,08333	0,02286
7	19	6	12	0,13198	0,16667	0,03469
8	20	4	16	0,16178	0,22222	0,06044
9	21	3	19	0,19566	0,26389	0,06823
10	22	4	23	0,23353	0,31944	0,08592
11	23	3	26	0,27514	0,36111	0,08597
12	24	0	26	0,32010	0,36111	0,04101
13	25	3	29	0,36788	0,40278	0,03490
14	26	3	32	0,41780	0,44444	0,02665
15	27	7	39	0,46907	0,54167	0,07259
16	28	3	42	0,52087	0,58333	0,06246
17	29	6	48	0,57232	0,66667	0,09435
18	30	3	51	0,62256	0,70833	0,08577
19	31	3	54	0,67081	0,75000	0,07919
20	32	1	55	0,71637	0,76389	0,04752
21	33	2	57	0,75867	0,79167	0,03300
22	34	1	58	0,79728	0,80556	0,00827
23	35	3	61	0,83195	0,84722	0,01528
24	36	0	61	0,86254	0,84722	0,01532
25	37	1	62	0,88910	0,86111	0,02799
26	38	1	63	0,91176	0,87500	0,03676
27	39	2	65	0,93078	0,90278	0,02800
28	40	0	65	0,94647	0,90278	0,04369
29	41	2	67	0,95920	0,93056	0,02865
30	42	0	67	0,96936	0,93056	0,03880
31	43	2	69	0,97732	0,95833	0,01899
32	44	3	72	0,98347	1,00000	0,01653

Lampiran 3. Nilai Kritis Uji Normalitas Kolmogorov – Smirnov

$\alpha; n$	**0,01**	**0,05**	**0,1**	**0,15**	**0,2**
1	0,995	0,975	0,950	0,925	0,900
2	0,929	0,842	0,776	0,726	0,684
3	0,828	0,708	0,642	0,597	0,565
4	0,733	0,624	0,564	0,525	0,494
5	0,669	0,565	0,510	0,474	0,446
6	0,618	0,521	0,470	0,436	0,410
7	0,577	0,486	0,438	0,405	0,381
8	0,543	0,457	0,411	0,381	0,358
9	0,514	0,432	0,388	0,360	0,339
10	0,490	0,410	0,368	0,342	0,322
11	0,468	0,391	0,352	0,326	0,307
12	0,450	0,375	0,338	0,313	0,295
13	0,433	0,361	0,325	0,302	0,284
14	0,418	0,349	0,314	0,292	0,274
15	0,404	0,338	0,304	0,283	0,266
16	0,392	0,328	0,295	0,274	0,258
17	0,381	0,318	0,286	0,266	0,250
18	0,371	0,309	0,278	0,259	0,244
19	0,363	0,301	0,272	0,252	0,237
20	0,356	0,294	0,264	0,246	0,231
25	0,320	0,270	0,240	0,220	0,210
30	0,290	0,240	0,220	0,200	0,190
35	0,270	0,230	0,210	0,190	0,180
40	0,250	0,210	0,190	0,180	0,170
45	0,240	0,200	0,180	0,170	0,160
50	0,230	0,190	0,170	0,160	0,150
$n > 50$	$\frac{1,63}{\sqrt{n}}$	$\frac{1,36}{\sqrt{n}}$	$\frac{1,22}{\sqrt{n}}$	$\frac{1,14}{\sqrt{n}}$	$\frac{1,07}{\sqrt{n}}$

Lampiran 4. Peta Kendali EWMA untuk $\lambda = 0.1$ pada Fase I

j	X	Z_j	UCL	LCL	CL	Status
1	25	26,86	29,25	24,89	27,07	*in control*
2	22	26,37	30,00	24,13	27,07	*in control*
3	20	25,74	30,49	23,64	27,07	*in control*
4	18	24,96	30,84	23,29	27,07	*in control*
5	29	25,37	31,10	23,03	27,07	*in control*
6	23	25,13	31,30	22,83	27,07	*in control*
7	20	24,62	31,46	22,67	27,07	*in control*
8	23	24,46	31,58	22,55	27,07	*in control*
9	27	24,71	31,68	22,46	27,07	*in control*
10	30	25,24	31,75	22,38	27,07	*in control*
11	29	25,61	31,82	22,32	27,07	*in control*
12	22	25,25	31,86	22,27	27,07	*in control*
13	21	24,83	31,90	22,23	27,07	*in control*
14	35	25,85	31,94	22,20	27,07	*in control*
15	21	25,36	31,96	22,17	27,07	*in control*
16	27	25,52	31,98	22,15	27,07	*in control*
17	20	24,97	32,00	22,14	27,07	*in control*
18	19	24,37	32,01	22,12	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮	⋮
38	43	31,38	32,07	22,07	27,07	*in control*
39	35	**31,74**	32,07	22,07	27,07	*out of control*
40	44	32,97	32,07	22,07	27,07	*in control*
41	19	31,57	32,07	22,07	27,07	*in control*
51	22	30,61	32,07	22,07	27,07	*in control*
52	39	31,45	32,07	22,07	27,07	*in control*
53	35	31,81	32,07	22,07	27,07	*in control*
54	32	31,83	32,07	22,07	27,07	*in control*
55	28	31,44	32,07	22,07	27,07	*in control*
56	31	31,40	32,07	22,07	27,07	*in control*
57	18	30,06	32,07	22,07	27,07	*in control*
58	28	29,85	32,07	22,07	27,07	*in control*
59	44	31,27	32,07	22,07	27,07	*in control*
60	31	31,24	32,07	22,07	27,07	*in control*

Lampiran 5. Peta Kendali EWMA untuk $\lambda = 0.2$ pada Fase I sebelum revisi

j	X	Z_j	UCL	LCL	CL	Status
1	25	26,65	31,43	22,71	27,07	*in control*
2	22	25,72	32,65	21,48	27,07	*in control*
3	20	24,58	33,31	20,82	27,07	*in control*
4	18	23,26	33,70	20,44	27,07	*in control*
5	29	24,41	33,93	20,20	27,07	*in control*
6	23	24,13	34,08	20,05	27,07	*in control*
7	20	23,30	34,17	19,96	27,07	*in control*
8	23	23,24	34,23	19,90	27,07	*in control*
9	27	23,99	34,27	19,87	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮	⋮
37	41	**32,75**	34,33	19,80	27,07	*out of control*
38	43	**34,80**	34,33	19,80	27,07	*out of control*
39	35	**34,84**	34,33	19,80	27,07	*out of control*
40	44	36,67	34,33	19,80	27,07	*in control*
41	19	33,14	34,33	19,80	27,07	*in control*
42	22	30,91	34,33	19,80	27,07	*in control*
43	39	32,53	34,33	19,80	27,07	*in control*
44	35	33,02	34,33	19,80	27,07	*in control*
45	32	32,82	34,33	19,80	27,07	*in control*
46	28	31,85	34,33	19,80	27,07	*in control*
47	31	31,68	34,33	19,80	27,07	*in control*
48	18	28,95	34,33	19,80	27,07	*in control*
49	28	28,76	34,33	19,80	27,07	*in control*
50	44	31,81	34,33	19,80	27,07	*in control*
51	31	31,64	34,33	19,80	27,07	*in control*
52	19	29,12	34,33	19,80	27,07	*in control*
53	17	26,69	34,33	19,80	27,07	*in control*
54	25	26,35	34,33	19,80	27,07	*in control*
55	19	24,88	34,33	19,80	27,07	*in control*
56	22	24,31	34,33	19,80	27,07	*in control*
57	27	24,85	34,33	19,80	27,07	*in control*
58	26	25,08	34,33	19,80	27,07	*in control*
59	16	23,26	34,33	19,80	27,07	*in control*
60	19	22,41	34,33	19,80	27,07	*in control*

Lampiran 6. Peta Kendali EWMA untuk $\lambda = 0.3$ pada Fase I sebelum revisi

j	X	Z_j	UCL	LCL	CL	Status
1	25	26,45	33,61	20,53	27,07	*in control*
2	22	25,11	35,05	19,08	27,07	*in control*
3	20	23,58	35,67	18,46	27,07	*in control*
4	18	21,91	35,96	18,18	27,07	*in control*
5	29	24,03	36,09	18,04	27,07	*in control*
6	23	23,72	36,16	17,97	27,07	*in control*
7	20	22,61	36,19	17,94	27,07	*in control*
8	23	22,72	36,21	17,92	27,07	*in control*
9	27	24,01	36,22	17,92	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮	⋮
37	41	**34,43**	36,22	17,91	27,07	*out of control*
38	43	**37,00**	36,22	17,91	27,07	*out of control*
39	35	**36,40**	36,22	17,91	27,07	*out of control*
40	44	38,68	36,22	17,91	27,07	*in control*
41	19	32,78	36,22	17,91	27,07	*in control*
42	22	29,54	36,22	17,91	27,07	*in control*
43	39	32,38	36,22	17,91	27,07	*in control*
44	35	33,17	36,22	17,91	27,07	*in control*
45	32	32,82	36,22	17,91	27,07	*in control*
46	28	31,37	36,22	17,91	27,07	*in control*
47	31	31,26	36,22	17,91	27,07	*in control*
48	18	27,28	36,22	17,91	27,07	*in control*
49	28	27,50	36,22	17,91	27,07	*in control*
50	44	32,45	36,22	17,91	27,07	*in control*
51	31	32,01	36,22	17,91	27,07	*in control*
52	19	28,11	36,22	17,91	27,07	*in control*
53	17	24,78	36,22	17,91	27,07	*in control*
54	25	24,84	36,22	17,91	27,07	*in control*
55	19	23,09	36,22	17,91	27,07	*in control*
56	22	22,76	36,22	17,91	27,07	*in control*
57	27	24,03	36,22	17,91	27,07	*in control*
58	26	24,62	36,22	17,91	27,07	*in control*
59	16	22,04	36,22	17,91	27,07	*in control*
60	19	21,13	36,22	17,91	27,07	*in control*

Lampiran 7. Peta Kendali GWMA untuk $q = 0{,}1, \omega = 0{,}1$ pada Fase I

j	Y_j	UCL	LCL	CL	Status
1	22,50	46,688	7,446	27,07	*in control*
2	20,18	46,690	7,443	27,07	*in control*
3	18,54	46,691	7,442	27,07	*in control*
4	16,82	46,692	7,442	27,07	*in control*
5	26,76	46,692	7,442	27,07	*in control*
6	21,57	46,692	7,441	27,07	*in control*
7	18,91	46,692	7,441	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮
35	36,83	46,692	7,441	27,07	*in control*
36	29,80	46,692	7,441	27,07	*in control*
37	38,78	46,692	7,441	27,07	*in control*
38	40,74	46,692	7,441	27,07	*in control*
39	33,66	46,692	7,441	27,07	*in control*
40	41,72	46,692	7,441	27,07	*in control*
41	19,36	46,692	7,441	27,07	*in control*
42	21,76	46,692	7,441	27,07	*in control*
43	36,96	46,692	7,441	27,07	*in control*
44	33,55	46,692	7,441	27,07	*in control*
45	30,89	46,692	7,441	27,07	*in control*
46	27,27	46,692	7,441	27,07	*in control*
47	29,91	46,692	7,441	27,07	*in control*
48	18,23	46,692	7,441	27,07	*in control*
49	27,04	46,692	7,441	27,07	*in control*
50	41,49	46,692	7,441	27,07	*in control*
51	30,05	46,692	7,441	27,07	*in control*
52	19,19	46,692	7,441	27,07	*in control*
53	17,20	46,692	7,441	27,07	*in control*
54	24,27	46,692	7,441	27,07	*in control*
55	18,91	46,692	7,441	27,07	*in control*
56	21,53	46,692	7,441	27,07	*in control*
57	26,02	46,692	7,441	27,07	*in control*
58	25,19	46,692	7,441	27,07	*in control*
59	16,21	46,692	7,441	27,07	*in control*
60	18,77	46,692	7,441	27,07	*in control*

Lampiran 8. Peta Kendali GWMA untuk q=0,5,ω=0,3 pada Fase I sebelum revisi

j	Y_j	UCL	LCL	CL	Status
1	**12,50**	37,967	16,166	27,07	*out of control*
2	**12,85**	38,086	16,047	27,07	*out of control*
3	**12,74**	38,129	16,005	27,07	*out of control*
4	**12,25**	38,150	15,983	27,07	*out of control*
5	18,03	38,163	15,970	27,07	*in control*
6	16,12	38,172	15,962	27,07	*in control*
7	**14,91**	38,178	15,956	27,07	*out of control*
8	16,49	38,182	15,951	27,07	*in control*
9	18,85	38,185	15,948	27,07	*in control*
10	20,93	38,188	15,945	27,07	*in control*
11	21,08	38,190	15,943	27,07	*in control*
12	17,98	38,192	15,942	27,07	*in control*
13	17,31	38,193	15,940	27,07	*in control*
14	24,22	38,194	15,939	27,07	*in control*
15	18,26	38,195	15,938	27,07	*in control*
16	20,88	38,196	15,937	27,07	*in control*
17	17,69	38,197	15,937	27,07	*in control*
18	16,90	38,197	15,936	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮
47	27,37	38,203	15,930	27,07	*in control*
48	20,95	38,203	15,930	27,07	*in control*
49	25,03	38,203	15,930	27,07	*in control*
50	33,24	38,203	15,930	27,07	*in control*
51	28,00	38,203	15,930	27,07	*in control*
52	21,79	38,203	15,930	27,07	*in control*
53	19,85	38,203	15,930	27,07	*in control*
54	23,17	38,203	15,930	27,07	*in control*
55	20,32	38,203	15,930	27,07	*in control*
56	21,40	38,203	15,930	27,07	*in control*
57	23,85	38,203	15,930	27,07	*in control*
58	23,65	38,203	15,930	27,07	*in control*
59	18,74	38,203	15,930	27,07	*in control*
60	19,56	38,203	15,930	27,07	*in control*

Lampiran 9. Peta Kendali GWMA untuk q=0,6,ω=0,5 pada Fase I sebelum revisi

j	Y_j	UCL	LCL	CL	Status
1	**10,00**	35,787	18,346	27,07	*out of control*
2	**11,66**	36,137	17,997	27,07	*out of control*
3	**12,34**	36,275	17,859	27,07	*out of control*
4	**12,41**	36,346	17,787	27,07	*out of control*
5	**17,30**	36,389	17,744	27,07	*out of control*
6	**16,61**	36,417	17,717	27,07	*out of control*
7	**15,92**	36,436	17,698	27,07	*out of control*
8	**17,27**	36,449	17,684	27,07	*out of control*
9	19,43	36,459	17,674	27,07	*in control*
10	21,53	36,466	17,667	27,07	*in control*
11	22,15	36,472	17,661	27,07	*in control*
12	19,99	36,477	17,657	27,07	*in control*
13	19,33	36,480	17,653	27,07	*in control*
14	24,76	36,483	17,650	27,07	*in control*
15	20,72	36,485	17,648	27,07	*in control*
16	22,54	36,487	17,646	27,07	*in control*
17	20,19	36,489	17,645	27,07	*in control*
18	19,31	36,490	17,643	27,07	*in control*
⋮	⋮	⋮	⋮	⋮	⋮
47	30,03	36,498	17,635	27,07	*in control*
48	24,89	36,498	17,635	27,07	*in control*
49	27,42	36,498	17,635	27,07	*in control*
50	34,04	36,498	17,635	27,07	*in control*
51	30,73	36,498	17,635	27,07	*in control*
52	25,63	36,498	17,635	27,07	*in control*
53	23,35	36,498	17,635	27,07	*in control*
54	25,41	36,498	17,635	27,07	*in control*
55	23,14	36,498	17,635	27,07	*in control*
56	23,64	36,498	17,635	27,07	*in control*
57	25,50	36,498	17,635	27,07	*in control*
58	25,52	36,498	17,635	27,07	*in control*
59	21,63	36,498	17,635	27,07	*in control*
60	21,76	36,498	17,635	27,07	*in control*

Lampiran 10. Peta Kendali EWMA untuk $\lambda = 0{,}2$ pada Fase II

j	Z_j	UCL	LCL	CL	Status
1	26,80	30,09	22,10	26,09	*in control*
2	27,44	31,21	20,97	26,09	*in control*
3	27,35	31,81	20,37	26,09	*in control*
4	30,08	32,17	20,02	26,09	*in control*
5	30,87	32,38	19,80	26,09	*out of control*
6	33,29	32,52	19,66	26,09	*out of control*
7	35,43	32,60	19,58	26,09	*in control*
8	32,15	32,66	19,53	26,09	*in control*
9	32,32	32,69	19,49	26,09	*in control*
10	31,25	32,71	19,47	26,09	*in control*
11	30,80	32,73	19,46	26,09	*in control*
12	29,24	32,73	19,45	26,09	*in control*

Lampiran 11. Peta Kendali EWMA untuk $\lambda = 0{,}3$ pada Fase II

j	Z_j	UCL	LCL	CL	Status
1	25,08	32,08	20,10	26,09	*in control*
2	26,55	33,41	18,78	26,09	*in control*
3	26,69	33,97	18,21	26,09	*in control*
4	30,98	34,24	17,94	26,09	*in control*
5	31,89	34,36	17,82	26,09	*out of control*
6	35,22	34,42	17,76	26,09	*out of control*
7	37,85	34,45	17,73	26,09	*in control*
8	32,20	34,47	17,71	26,09	*in control*
9	32,44	34,48	17,71	26,09	*in control*
10	30,81	34,48	17,70	26,09	*in control*
11	30,26	34,48	17,70	26,09	*in control*
12	28,09	34,48	17,70	26,09	*in control*

Lampiran 12. Peta Kendali GWMA untuk q=0,5,ω=0,3 pada Fase II

j	Y_j	UCL	LCL	CL	Status
1	6,50	41,987	16,763	29,375	*out of control*
2	15,96	42,124	16,626	29,375	*out of control*
3	16,30	42,174	16,576	29,375	*out of control*
4	24,25	42,199	16,551	29,375	*in control*
5	22,51	42,214	16,536	29,375	*in control*
6	27,69	42,223	16,527	29,375	*in control*
7	29,47	42,230	16,520	29,375	*in control*
8	17,98	42,235	16,515	29,375	*in control*
9	23,92	42,239	16,511	29,375	*in control*
10	21,50	42,242	16,508	29,375	*in control*
11	22,45	42,245	16,505	29,375	*in control*
12	19,66	42,247	16,503	29,375	*in control*

Lampiran 13. Peta Kendali GWMA untuk q=0,6,ω=0,5 pada Fase II

j	Y_j	UCL	LCL	CL	Status
1	5,20	38,528	17,038	27,783	*out of control*
2	13,49	38,959	16,607	27,783	*out of control*
3	15,18	39,128	16,437	27,783	*out of control*
4	22,36	39,217	16,349	27,783	*in control*
5	22,37	39,269	16,296	27,783	*in control*
6	27,16	39,303	16,262	27,783	*in control*
7	29,61	39,327	16,239	27,783	*in control*
8	21,24	39,343	16,222	27,783	*in control*
9	25,27	39,356	16,210	27,783	*in control*
10	23,72	39,365	16,201	27,783	*in control*
11	24,43	39,372	16,193	27,783	*in control*
12	22,31	39,377	16,188	27,783	*in control*

Lampiran 14. Perhitungan Jumlah Titik *Out of Control* dan *In Control* untuk Setiap Nilai Pembobot

```
project_data <- read.csv('C:/Users/LENOVO/Downloads/skripsi ara/dokumen sidang/data skripsi fase 1.csv',
                         header = TRUE, sep = ';')

optimized_simulation <- function(data, weights_q, weights_a){
  data <- data[,1]
  num_data <- length(data)

  final_result <- data.frame(Yj = numeric(), UCL = numeric(), CL = numeric(),
                             LCL = numeric())

  avg_data <- mean(data)
  std_data <- sd(data)

  L <- 3
  n <- 1

  result_data <- data.frame(Yj = numeric())

  for (j in 1 : num_data){
    sum <- 0

    for (i in 1 : j){
      index <- j - i + 1

      sum <- sum + ((weights_q ^ ((i - 1) ^ weights_a)) - (weights_q ^ (i ^ weights_a))) * data[index]
    }
    result_data <- rbind(result_data, data.frame(Yj = sum))
  }

  control_data <- data.frame(UCL = numeric(), CL = numeric(),
                             LCL = numeric())

  for (j in 1 : num_data){
    qj_value <- 0

    for (i in 1 : j){
      qj_value <- qj_value + (weights_q ^ ((i - 1) ^ weights_a) - weights_q ^ (i ^ weights_a)) ^ 2
    }
    initial_value <- (L * (sqrt(qj_value / n) * std_data))

    up_control <- avg_data + initial_value
    control <- avg_data
    low_control <- avg_data - initial_value

    control_data <- rbind(control_data, data.frame(UCL = up_control, CL = control,
                                                   LCL = low_control))
  }

  num_out_control <- c()
  num_in_control <- c()

  for (i in 1 : nrow(result_data)) {
    if (result_data$Yj[i] > control_data$UCL[i] || result_data$Yj[i] < control_data$LCL[i]) {
      num_out_control <- c(num_out_control, i)
    } else {
      num_in_control <- c(num_in_control, i)
    }
  }
  cat('Jumlah Out of Control adalah', length(num_out_control), '\n')
  cat('Jumlah In of Control adalah', length(num_in_control), '\n')

  final_result <- cbind(result_data, control_data)
  return(final_result)
}
```

Lampiran 15. Program Batas Kendali Optimum Fase I

```
data_input <- read.csv('C:/Users/LENOVO/Downloads/skripsi ara/dokumen sidang/data skripsi fase 1.csv', sep = ';',
                       header = TRUE)


optimized_simulation <- function(data, weights_q, weights_a) {
  data <- data[, 1]
  num_data <- length(data)

  L <- 3
  n <- 1

  repeat {
    # Calculate average and standard deviation of data
    avg_data <- mean(data)
    std_data <- sd(data)

    # Compute result_data
    result_data <- data.frame(Yj = numeric())
    for (j in 1:num_data) {
      sum <- 0
      for (i in 1:j) {
        index <- j - i + 1
        sum <- sum + ((weights_q ^ ((i - 1) ^ weights_a)) - (weights_q ^ (i ^ weights_a))) * data[index]
      }
      result_data <- rbind(result_data, data.frame(Yj = sum))
    }

    # Compute control_data
    control_data <- data.frame(UCL = numeric(), CL = numeric(), LCL = numeric())
    for (j in 1:num_data) {
      qj_value <- 0
      for (i in 1:j) {
        qj_value <- qj_value + (weights_q ^ ((i - 1) ^ weights_a) - weights_q ^ (i ^ weights_a)) ^ 2
      }
      initial_value <- (L * (sqrt(qj_value / n) * std_data))
      up_control <- avg_data + initial_value
      control <- avg_data
      low_control <- avg_data - initial_value
      control_data <- rbind(control_data, data.frame(UCL = up_control, CL = control, LCL = low_control))

    }

    # Identify out-of-control points
    num_out_control <- which(result_data$Yj > control_data$UCL | result_data$Yj < control_data$LCL)

    if (length(num_out_control) == 0) {
      break
    }

    # Remove out-of-control values
    result_data <- result_data[-num_out_control, , drop = FALSE]
    data <- data[-num_out_control]
    num_data <- length(data)  # Update num_data based on new data length
  }

  final_result <- cbind(result_data, control_data)
  return(final_result)
}
```