

Table 1: EWMA charts Control limits for different combination of  $m$  and  $\lambda$  for a  $ARL_0 = 200$

m	$\lambda$					
	0.03	0.05	0.1	0.25	0.5	0.75
25	2.423	2.534	2.666	2.775	2.803	2.796
50	2.335	2.460	2.611	2.752	2.799	2.805
100	2.264	2.400	2.565	2.730	2.795	2.805
500	2.163	2.311	2.505	2.699	2.784	2.805
1000	2.142	2.297	2.493	2.692	2.783	2.802

Table 2: ARL and SDRL values of EWMA chart with estimated parameters form  $m = 25$  and  $n = 5$

$\delta$	$\lambda$											
	0.03		0.05		0.1		0.25		0.5		0.75	
	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	200.30	334.43	202.07	326.35	202.90	320.49	203.06	315.11	199.67	307.05	198.47	290.48
0.25	119.83	247.51	124.42	244.86	129.32	240.88	137.25	236.94	149.15	243.28	159.44	250.05
0.50	36.32	90.36	38.80	94.30	43.30	102.74	54.70	111.25	71.81	132.11	89.93	152.54
0.75	12.98	20.18	13.97	27.87	15.58	26.21	20.58	35.44	30.64	54.64	43.67	70.99
1.00	7.11	6.49	7.62	6.93	8.32	7.85	9.98	11.17	14.57	20.19	22.28	33.61
1.50	3.49	2.42	3.71	2.51	3.98	2.65	4.38	3.15	5.37	4.90	7.51	8.49
2.00	2.23	1.30	2.36	1.36	2.52	1.44	2.67	1.56	2.97	2.04	3.60	3.13
2.50	1.65	0.83	1.72	0.87	1.83	0.92	1.92	0.98	2.01	1.13	2.22	1.53
3.00	1.33	0.57	1.38	0.60	1.44	0.64	1.51	0.68	1.54	0.73	1.60	0.88
4.00	1.06	0.25	1.08	0.28	1.10	0.31	1.12	0.34	1.13	0.35	1.13	0.37
5.00	1.01	0.08	1.01	0.09	1.01	0.11	1.02	0.13	1.02	0.13	1.02	0.13

Table 3: ARL and SDRL values of EWMA chart with estimated parameters form  $m = 50$  and  $n = 5$

$\delta$	$\lambda$											
	0.03		0.05		0.1		0.25		0.5		0.75	
	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.64	278.60	200.20	265.77	201.40	256.03	201.38	248.68	198.81	243.92	200.58	247.49
0.25	91.65	163.25	94.91	157.96	103.14	161.58	119.36	168.63	136.79	181.22	152.20	195.02
0.50	23.71	36.87	25.83	37.36	29.69	43.26	40.68	59.43	59.30	81.75	78.83	105.14
0.75	10.53	9.69	11.46	10.29	12.76	11.96	16.62	18.67	25.38	31.12	38.10	48.18
1.00	6.28	4.92	6.81	5.19	7.44	5.64	9.00	7.86	12.85	13.52	19.81	23.32
1.50	3.23	2.12	3.46	2.21	3.76	2.35	4.19	2.76	5.09	4.08	7.03	6.80
2.00	2.11	1.19	2.25	1.26	2.41	1.33	2.61	1.46	2.88	1.85	3.50	2.79
2.50	1.58	0.77	1.66	0.81	1.77	0.87	1.88	0.93	1.98	1.07	2.20	1.44
3.00	1.29	0.52	1.34	0.56	1.41	0.61	1.49	0.66	1.53	0.71	1.60	0.85
4.00	1.05	0.22	1.07	0.25	1.09	0.29	1.11	0.32	1.12	0.34	1.13	0.36
5.00	1.00	0.07	1.01	0.08	1.01	0.10	1.01	0.12	1.02	0.12	1.02	0.12

Table 4: ARL and SDRL values of EWMA chart with estimated parameters form  $m = 100$  and  $n = 5$

$\delta$	$\lambda$											
	0.03		0.05		0.1		0.25		0.5		0.75	
	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.60	278.99	200.15	261.50	199.80	253.57	199.38	247.63	200.07	247.33	199.49	242.45
0.25	91.36	163.84	94.98	158.06	103.11	159.73	119.23	170.09	135.85	180.19	150.02	194.82
0.50	23.74	36.07	25.62	37.88	29.39	42.38	40.50	57.68	59.60	82.54	79.55	105.86
0.75	10.48	9.64	11.37	10.99	12.74	12.14	16.51	18.11	25.72	31.82	38.31	48.35
1.00	6.28	4.92	6.82	5.19	7.49	5.68	8.98	7.86	12.91	13.80	19.80	23.37
1.50	3.23	2.12	3.47	2.22	3.76	2.35	4.18	2.75	5.08	4.09	7.08	6.95
2.00	2.10	1.19	2.24	1.26	2.42	1.33	2.62	1.46	2.89	1.83	3.49	2.78
2.50	1.58	0.77	1.66	0.81	1.77	0.87	1.88	0.93	1.99	1.07	2.19	1.42
3.00	1.29	0.52	1.34	0.56	1.41	0.60	1.48	0.65	1.53	0.71	1.59	0.84
4.00	1.05	0.23	1.07	0.25	1.09	0.28	1.11	0.33	1.12	0.34	1.13	0.36
5.00	1.00	0.07	1.01	0.08	1.01	0.10	1.01	0.12	1.02	0.12	1.02	0.13

Table 5: ARL and SDRL values of EWMA chart with estimated parameters form  $m = 500$  and  $n = 5$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\delta$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	201.27	233.23	200.91	218.50	201.20	209.64	199.41	203.69	200.91	205.07	200.88	203.72
0.25	47.69	50.66	53.52	55.41	64.84	66.58	89.05	92.34	117.72	121.31	140.62	143.89
0.50	16.23	14.17	18.08	15.21	21.14	17.94	30.03	28.21	47.68	48.05	68.32	69.77
0.75	8.42	6.68	9.30	7.03	10.57	7.78	13.74	11.31	21.54	20.34	33.59	33.69
1.00	5.31	3.88	5.87	4.13	6.61	4.50	8.01	5.87	11.54	10.15	17.73	17.06
1.50	2.85	1.79	3.11	1.93	3.47	2.08	3.94	2.40	4.82	3.51	6.67	5.76
2.00	1.91	1.05	2.06	1.13	2.26	1.22	2.51	1.35	2.81	1.69	3.40	2.51
2.50	1.46	0.68	1.55	0.73	1.67	0.80	1.82	0.88	1.95	1.01	2.15	1.33
3.00	1.22	0.46	1.27	0.50	1.35	0.56	1.44	0.62	1.51	0.68	1.58	0.81
4.00	1.03	0.18	1.05	0.21	1.07	0.26	1.10	0.30	1.12	0.33	1.12	0.35
5.00	1.00	0.05	1.00	0.06	1.01	0.08	1.01	0.10	1.01	0.12	1.01	0.12

Table 6: ARL and SDRL values of EWMA chart with estimated parameters form  $m = 1000$  and  $n = 5$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\delta$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.37	228.70	199.48	215.98	200.27	206.02	199.16	201.93	200.69	202.78	199.68	200.32
0.25	45.81	46.27	51.48	50.69	62.19	61.56	86.24	87.06	117.06	118.66	137.52	137.56
0.50	15.77	13.66	17.58	14.52	20.80	17.31	29.25	26.92	46.69	45.91	67.14	67.12
0.75	8.26	6.48	9.18	6.92	10.49	7.68	13.61	11.19	21.22	19.93	32.77	32.18
1.00	5.21	3.85	5.77	4.07	6.52	4.41	7.89	5.74	11.45	9.94	17.57	16.72
1.50	2.81	1.79	3.08	1.91	3.43	2.05	3.92	2.37	4.81	3.47	6.61	5.66
2.00	1.89	1.04	2.04	1.11	2.25	1.21	2.51	1.35	2.80	1.68	3.38	2.49
2.50	1.45	0.67	1.54	0.73	1.67	0.80	1.82	0.88	1.94	1.01	2.14	1.32
3.00	1.21	0.45	1.27	0.50	1.35	0.56	1.44	0.62	1.51	0.68	1.57	0.81
4.00	1.03	0.18	1.04	0.21	1.07	0.25	1.10	0.30	1.12	0.33	1.12	0.34
5.00	1.00	0.05	1.00	0.06	1.01	0.08	1.01	0.10	1.01	0.11	1.01	0.12

Table 7: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 1$  and  $m = 25$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	201.27	336.90	202.13	327.59	201.45	311.11	201.41	314.19	199.43	311.01	200.67	299.32
0.01	211.03	359.88	212.27	353.85	215.43	351.12	218.64	370.38	223.16	376.61	222.93	366.05
0.02	219.60	386.50	221.86	396.88	228.06	404.03	239.03	415.95	244.73	438.85	251.11	476.72
0.03	229.09	412.93	233.96	424.30	246.81	457.87	260.90	577.30	270.88	504.46	282.39	606.90
0.04	241.18	454.80	249.08	462.52	264.63	574.55	288.02	686.59	307.35	761.52	312.39	708.16
0.05	249.85	495.10	262.44	553.64	282.03	584.03	313.21	684.71	338.01	840.64	352.98	838.97
0.06	263.52	588.66	272.39	546.46	302.96	706.18	338.16	825.89	369.52	984.98	395.14	1058.24
0.07	271.78	563.08	287.53	678.37	318.77	734.18	370.76	898.14	416.57	1146.75	440.80	1177.65
0.08	286.15	603.79	308.40	743.88	347.99	925.06	403.65	1108.73	455.95	1243.28	484.49	1335.73
0.09	296.12	667.02	319.37	719.79	372.21	1013.87	446.59	1290.85	510.49	1490.39	547.09	1670.42
0.10	317.73	762.80	341.55	840.22	398.61	1018.96	494.51	1535.91	570.15	1713.53	606.58	1832.77

Table 8: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 2$  and  $m = 25$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.9	327.0	200.1	318.7	202.1	314.4	200.0	308.7	200.7	305.7	200.9	304.8
0.01	230.3	502.6	234.6	500.8	252.8	723.4	278.6	861.9	301.6	1106.0	306.3	1008.1
0.02	261.4	685.8	282.1	920.7	314.3	1051.5	376.1	1454.3	440.3	1811.1	472.4	1937.7
0.03	297.0	912.9	325.6	1088.5	402.1	1593.6	505.1	2052.4	632.8	2707.7	700.9	2864.8
0.04	346.7	1286.3	404.1	1773.4	514.0	2197.8	691.0	2915.7	882.7	3678.2	1003.0	4141.7
0.05	410.7	1711.3	480.1	2069.6	634.0	2733.5	892.5	3687.3	1192.3	4654.2	1334.9	4953.8
0.06	464.4	1877.1	577.7	2608.6	802.2	3463.5	1174.9	4625.0	1514.8	5538.4	1759.5	6184.6
0.07	559.5	2485.2	678.8	3030.1	980.8	4077.9	1475.0	5534.9	1975.8	6796.1	2246.5	7390.3

<b>0.08</b>	664.7	3060.6	836.4	3766.7	1174.6	4834.4	1813.6	6400.2	2414.8	7833.3	2791.8	8525.6
<b>0.09</b>	744.6	3387.6	959.1	4102.0	1381.6	5385.3	2163.5	7319.3	3002.6	8990.0	3415.0	9805.3
<b>0.10</b>	861.4	3822.3	1125.7	4775.7	1668.2	6322.0	2618.8	8387.4	3550.5	10000.7	4054.6	10833.2

Table 9: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 3$  and  $m = 25$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	203.0	341.5	199.3	319.4	201.9	314.8	201.1	309.5	199.3	309.7	201.2	302.5
<b>0.01</b>	250.5	801.7	261.9	759.5	295.4	1070.2	365.2	1584.3	455.8	2254.3	526.5	2656.4
<b>0.02</b>	320.6	1267.0	370.9	1731.4	485.0	2380.2	656.8	3153.9	864.2	3936.3	1023.1	4609.3
<b>0.03</b>	422.4	1969.3	511.9	2591.8	693.3	3396.2	1043.5	4589.7	1431.1	5751.5	1686.3	6522.2
<b>0.04</b>	565.7	2855.6	690.9	3342.5	999.9	4606.6	1518.4	5974.4	2113.4	7540.7	2470.2	8283.8
<b>0.05</b>	710.8	3527.0	927.1	4516.2	1338.3	5773.9	2126.8	7727.4	2878.4	9130.2	3340.1	9980.9
<b>0.06</b>	896.6	4339.6	1184.6	5401.0	1737.0	6883.7	2798.6	9209.7	3771.9	10881.7	4384.9	11810.8
<b>0.07</b>	1101.4	5137.3	1439.0	6172.8	2147.8	7915.1	3464.2	10484.9	4603.0	12184.2	5397.9	13366.6
<b>0.08</b>	1331.3	5952.4	1798.6	7236.3	2598.7	9010.4	4096.6	11547.2	5527.7	13517.4	6200.9	14359.5
<b>0.09</b>	1535.7	6647.4	2070.3	8048.1	3061.1	9985.4	4774.8	12645.6	6290.7	14523.8	7183.9	15664.7
<b>0.10</b>	1786.9	7358.9	2340.2	8587.7	3461.5	10801.1	5362.8	13541.7	7068.8	15589.5	7973.4	16645.1

Table 10: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 1$  and  $m = 50$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.64	277.70	200.03	265.83	200.06	252.88	199.71	246.35	199.39	242.81	200.68	244.49
<b>0.01</b>	208.55	295.00	209.78	281.37	211.53	274.09	215.91	273.58	218.08	280.59	221.06	279.14
<b>0.02</b>	216.48	308.83	220.08	300.84	223.72	294.28	232.12	302.45	238.23	316.16	244.34	322.49
<b>0.03</b>	227.20	331.01	230.41	319.50	241.79	329.88	251.71	339.25	261.40	357.12	266.93	356.13
<b>0.04</b>	237.67	350.24	244.05	363.44	254.57	353.11	273.15	374.10	284.35	393.94	294.33	411.75
<b>0.05</b>	246.56	370.38	253.03	362.42	268.58	379.60	294.66	417.00	314.52	456.00	322.72	467.51
<b>0.06</b>	256.83	389.31	264.56	389.45	283.15	403.88	320.02	469.63	339.72	500.15	358.51	538.29
<b>0.07</b>	266.59	402.93	278.43	412.00	304.45	450.30	347.37	543.34	376.13	577.13	394.14	615.62
<b>0.08</b>	278.31	429.15	292.88	444.48	321.54	498.88	373.22	574.72	409.27	632.92	433.77	731.10
<b>0.09</b>	290.23	451.89	306.64	483.03	343.26	531.45	403.03	639.02	449.84	735.61	472.81	767.52
<b>0.10</b>	301.68	487.89	323.50	515.85	364.66	592.31	439.35	762.88	492.58	851.55	519.91	919.98

Table 11: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 2$  and  $m = 50$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.5	276.4	199.5	265.1	201.3	256.4	200.5	249.7	198.9	244.2	200.5	244.3
<b>0.01</b>	226.3	334.1	229.5	331.3	235.9	333.5	252.1	378.4	265.5	423.6	277.2	488.2
<b>0.02</b>	251.7	405.9	263.7	421.9	286.9	541.7	322.3	557.0	362.0	829.9	375.2	752.0
<b>0.03</b>	283.5	516.1	303.8	595.9	344.6	685.0	421.7	974.9	495.2	1276.6	528.3	1333.8
<b>0.04</b>	316.8	599.5	348.4	773.6	419.3	982.8	558.6	1539.7	662.0	1824.0	746.7	2122.5
<b>0.05</b>	361.7	782.8	413.4	984.0	520.2	1416.7	735.5	2170.2	902.8	2716.3	1020.8	2985.5
<b>0.06</b>	415.7	962.7	484.6	1369.6	627.9	1724.9	944.1	2852.1	1234.2	3726.2	1387.2	4003.0
<b>0.07</b>	468.3	1274.2	563.5	1613.7	767.4	2311.6	1221.8	3712.2	1643.3	4784.4	1893.9	5337.3
<b>0.08</b>	544.5	1583.7	677.2	2001.7	961.8	3037.3	1588.0	4703.7	2139.0	5892.0	2471.7	6621.1
<b>0.09</b>	625.9	1812.7	794.9	2500.7	1160.2	3689.2	1986.3	5725.3	2763.6	7263.0	3166.9	7976.2
<b>0.10</b>	714.4	2188.6	928.1	2975.4	1428.4	4453.2	2435.6	6718.4	3464.0	8627.1	3976.7	9331.3

Table 12: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 3$  and  $m = 50$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	201.8	283.6	198.8	262.4	199.6	253.8	199.7	243.2	199.4	245.0	199.8	244.5
<b>0.01</b>	241.1	454.9	250.1	420.7	274.6	568.8	320.9	782.8	355.3	922.4	377.9	1076.6
<b>0.02</b>	300.2	660.1	327.0	775.8	389.3	1148.3	526.7	1843.5	666.4	2451.8	752.2	2618.8

<b>0.03</b>	379.1	1131.4	440.6	1514.5	572.3	1963.4	889.2	3332.3	1183.2	4140.8	1333.6	4525.5
<b>0.04</b>	482.3	1636.4	592.2	2091.9	842.4	3078.7	1386.7	4814.3	1864.2	5937.5	2213.0	6709.2
<b>0.05</b>	633.2	2317.7	821.5	3225.8	1216.0	4371.8	2116.3	6749.5	2830.9	8033.0	3355.6	9039.1
<b>0.06</b>	816.1	3099.9	1084.9	4085.3	1701.6	5825.0	2882.7	8226.9	4105.7	10303.7	4716.5	11249.8
<b>0.07</b>	1042.3	4083.8	1416.4	5183.0	2255.7	7153.0	3931.2	10150.3	5473.4	12392.5	6301.2	13483.7
<b>0.08</b>	1284.8	4883.2	1834.6	6392.6	2939.5	8718.3	5043.1	11963.5	6926.1	14443.7	7772.4	15291.8
<b>0.09</b>	1630.0	5985.5	2259.6	7445.1	3645.9	10136.8	6219.0	13675.0	8289.6	16082.7	9388.5	17120.0
<b>0.10</b>	1927.0	6702.1	2786.8	8735.3	4406.8	11446.5	7397.2	15344.9	9557.9	17465.7	10720.6	18663.3

Table 13: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 1$  and  $m = 100$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	200.51	250.44	199.56	237.31	201.20	227.86	199.79	219.91	200.11	221.04	199.76	219.05
<b>0.01</b>	210.87	264.13	210.19	251.22	212.21	241.90	216.38	242.35	220.30	246.84	219.22	244.72
<b>0.02</b>	218.75	274.12	221.31	265.00	225.09	257.57	232.66	263.85	237.70	267.69	240.52	274.77
<b>0.03</b>	229.59	291.00	233.34	284.61	238.28	277.53	251.39	289.67	258.46	299.74	263.08	303.20
<b>0.04</b>	236.74	301.08	243.79	297.25	253.19	299.12	269.13	311.70	281.96	328.64	287.42	338.50
<b>0.05</b>	249.41	321.35	255.42	314.28	267.26	318.73	291.24	345.92	308.40	365.86	315.00	374.71
<b>0.06</b>	259.22	336.52	266.56	328.76	283.96	345.66	313.60	375.33	334.36	398.70	344.29	412.25
<b>0.07</b>	270.43	351.06	281.86	351.24	300.68	364.40	339.40	414.00	365.09	440.50	375.53	462.15
<b>0.08</b>	279.52	366.80	293.14	367.15	317.83	388.98	363.35	447.01	395.90	489.27	411.50	509.64
<b>0.09</b>	292.83	390.76	308.42	395.93	337.23	421.94	391.90	485.97	430.53	538.78	453.35	568.41
<b>0.10</b>	304.13	406.47	321.32	410.53	357.15	451.29	420.62	529.88	473.87	607.97	490.62	624.19

Table 14: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 2$  and  $m = 100$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	200.52	250.96	200.94	238.95	200.73	228.61	200.21	222.55	200.42	222.88	201.15	220.67
<b>0.01</b>	225.58	288.56	227.92	278.37	234.83	277.83	250.61	300.07	258.39	310.31	263.87	326.16
<b>0.02</b>	252.77	333.03	262.03	339.56	278.08	353.05	312.65	399.15	336.33	446.27	346.85	463.18
<b>0.03</b>	285.58	396.08	299.37	396.78	329.95	435.62	390.14	556.31	442.37	655.82	460.82	666.30
<b>0.04</b>	319.19	461.48	343.18	480.08	392.52	553.46	495.79	781.94	577.87	941.51	615.76	1028.00
<b>0.05</b>	356.14	534.80	397.22	590.76	472.17	729.31	628.84	1054.35	764.09	1349.79	822.86	1514.10
<b>0.06</b>	394.26	606.05	453.89	722.56	561.19	912.84	801.03	1479.24	1011.33	1953.16	1105.35	2178.24
<b>0.07</b>	448.75	730.54	523.75	868.26	675.42	1173.66	1009.59	1980.33	1355.92	2831.14	1491.79	2926.28
<b>0.08</b>	508.79	874.15	606.03	1081.22	823.20	1577.05	1311.74	2717.25	1783.72	3709.91	2002.59	4124.76
<b>0.09</b>	576.96	1068.63	707.31	1330.34	987.68	2008.39	1688.47	3696.87	2364.03	5102.76	2673.70	5632.18
<b>0.10</b>	644.41	1231.25	812.64	1683.34	1211.44	2643.34	2146.81	4628.46	3071.56	6339.64	3459.13	6917.77

Table 15: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 3$  and  $m = 100$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	200.8	249.7	201.6	239.1	200.5	240.5	200.8	222.2	202.1	224.9	199.8	218.9
<b>0.01</b>	242.8	323.4	251.4	321.7	282.6	368.0	297.3	408.0	322.7	485.2	333.5	504.7
<b>0.02</b>	292.4	429.4	316.0	458.1	386.3	608.6	446.4	749.5	537.9	1144.4	578.1	1162.9
<b>0.03</b>	362.7	587.2	406.7	670.5	535.3	1044.4	706.1	1514.4	904.7	2159.9	998.2	2406.4
<b>0.04</b>	444.0	825.5	522.9	1028.7	767.8	1809.5	1118.6	2827.3	1542.3	3853.9	1740.9	4394.8
<b>0.05</b>	555.7	1210.8	685.4	1595.8	1096.6	2758.1	1743.5	4343.1	2526.9	6119.2	2902.6	6870.9
<b>0.06</b>	708.1	1785.1	921.2	2325.2	1586.3	4176.0	2689.2	6575.9	3930.1	8697.3	4527.6	9633.5
<b>0.07</b>	898.4	2410.3	1240.7	3414.2	2227.6	5762.4	4005.4	8959.2	5787.7	11530.8	6596.7	12541.5
<b>0.08</b>	1140.3	3208.1	1630.1	4450.5	3043.4	7489.4	5552.7	11409.1	7880.3	14152.6	9030.5	15380.7
<b>0.09</b>	1470.6	4248.3	2196.5	5997.7	4168.9	9631.0	7263.0	13625.8	10183.0	16664.5	11546.9	17971.4
<b>0.10</b>	1851.5	5346.7	2832.9	7530.4	5367.5	11644.1	9255.1	16052.7	12419.7	19035.6	13641.8	19979.1

Table 16: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 1$  and  $m = 500$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	202.79	233.94	199.39	217.39	199.57	208.97	200.06	203.30	199.44	201.56	201.09	203.96
0.01	210.71	242.83	210.72	228.59	211.85	219.92	216.68	221.24	218.22	222.65	219.45	223.29
0.02	220.59	251.57	220.38	238.45	226.12	235.35	232.14	238.39	236.97	243.34	240.70	245.36
0.03	231.69	263.19	233.77	253.48	240.75	251.94	251.18	256.72	257.40	263.11	260.58	267.65
0.04	243.29	277.84	244.94	265.29	255.46	267.00	270.37	278.81	279.45	287.08	284.21	289.66
0.05	253.22	288.20	257.44	278.82	271.95	283.32	291.09	300.86	303.69	312.64	308.97	317.94
0.06	264.37	298.21	271.44	292.61	288.64	300.92	310.59	319.11	330.35	340.41	338.78	350.81
0.07	277.92	313.55	286.27	310.36	304.72	319.57	338.01	350.79	360.45	374.49	370.87	385.96
0.08	290.53	327.76	300.93	325.42	324.23	340.03	360.60	374.44	390.97	403.52	401.67	416.67
0.09	304.13	343.98	314.60	340.81	344.07	361.02	388.66	404.33	422.55	441.87	442.58	465.95
0.10	317.47	358.16	330.80	356.23	366.18	383.70	420.86	437.87	463.01	481.46	478.76	500.52

Table 17: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 2$  and  $m = 500$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	200.08	232.41	199.12	216.78	201.09	209.29	200.56	204.20	199.98	202.97	200.75	204.26
0.01	229.24	262.08	229.34	249.19	238.41	248.77	248.64	257.40	253.71	263.36	258.05	267.04
0.02	260.25	294.44	265.59	288.40	283.62	297.19	306.69	319.13	323.37	337.95	331.87	348.60
0.03	296.86	334.52	307.50	336.44	333.97	352.31	378.92	398.06	412.58	437.88	429.88	461.37
0.04	334.22	377.31	352.11	385.03	396.37	424.28	471.80	506.87	529.46	573.71	555.47	601.81
0.05	380.16	433.32	409.79	448.25	474.51	511.53	586.64	635.16	679.14	739.90	718.59	790.95
0.06	431.88	492.53	468.66	522.19	567.06	616.80	738.29	812.02	876.65	983.10	940.34	1056.06
0.07	484.38	560.01	539.93	604.52	676.14	745.33	921.75	1036.93	1132.16	1288.93	1225.56	1390.86
0.08	546.71	635.78	624.39	710.56	812.50	914.77	1162.58	1331.47	1477.46	1703.79	1616.37	1882.84
0.09	617.79	722.82	717.10	823.27	968.73	1113.85	1466.49	1737.00	1911.44	2272.91	2109.40	2535.20
0.10	696.89	831.85	833.59	968.04	1158.91	1338.00	1839.10	2189.36	2486.53	3012.19	2768.63	3365.94

Table 18: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 3$  and  $m = 500$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	200.7	231.2	198.3	215.8	200.6	208.1	199.6	203.0	20.0	205.0	200.7	204.0
0.01	250.6	286.6	255.5	280.6	269.0	283.0	288.4	300.5	303.9	320.5	310.0	326.0
0.02	310.8	355.4	326.8	359.8	365.0	394.2	422.4	458.5	470.8	518.2	487.0	536.4
0.03	382.9	442.5	418.3	470.2	494.2	545.3	624.2	703.2	731.6	841.2	772.8	891.3
0.04	474.3	558.5	531.0	610.4	672.1	765.7	929.6	1086.5	1157.8	1391.1	1261.7	1559.4
0.05	591.8	717.2	688.8	813.3	925.4	1096.4	1409.5	1752.9	1856.1	2379.3	2049.9	2618.1
0.06	735.1	907.7	890.4	1095.9	1299.4	1625.0	2169.9	2814.1	3034.3	4108.8	3398.9	4585.5
0.07	909.7	1180.6	1159.2	1478.2	1801.8	2355.6	3356.6	4507.9	4931.6	6819.2	5592.2	7610.6
0.08	1133.4	1509.3	1520.3	2045.3	2567.4	3500.7	5233.5	7253.5	7901.9	10528.1	9081.6	11927.4
0.09	1427.2	2021.0	2034.1	2862.2	3670.2	5235.8	8083.6	10896.9	12197.1	15145.7	13865.3	16743.2
0.10	1813.3	2678.5	2659.5	3903.7	5232.9	7551.4	11790.6	15047.3	17140.1	19497.6	19031.3	20904.4

Table 19: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 1$  and  $m = 1000$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.91	229.74	199.49	214.56	201.78	207.64	197.83	199.08	201.65	202.52	199.05	200.00
0.01	210.03	239.89	211.46	226.81	212.88	219.61	214.62	216.63	218.53	219.76	216.26	218.93
0.02	221.43	251.79	223.29	240.55	227.45	234.09	231.85	234.44	237.21	238.76	236.79	238.34
0.03	231.76	263.28	234.55	251.67	241.55	248.12	248.53	251.92	257.19	258.95	259.29	262.62
0.04	244.59	277.96	249.04	265.69	256.13	264.70	268.51	271.80	280.30	284.34	282.09	283.15
0.05	255.35	285.93	261.76	280.07	272.60	281.44	289.14	292.47	303.19	305.19	306.36	311.68
0.06	268.05	298.86	275.93	295.16	289.60	298.54	311.47	316.47	331.66	337.27	333.43	338.90
0.07	280.44	312.46	291.21	309.74	307.65	316.02	336.19	342.26	360.01	365.73	365.78	372.75

<b>0.08</b>	292.89	327.85	306.55	325.49	326.61	336.19	363.08	368.57	392.81	399.70	397.27	404.95
<b>0.09</b>	308.34	344.32	323.47	342.77	348.78	358.98	389.69	397.26	426.18	434.88	433.39	443.03
<b>0.10</b>	322.78	356.88	338.36	358.74	368.39	377.48	419.20	425.31	461.77	471.48	471.16	482.81

Table 20: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 2$  and  $m = 1000$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	201.19	230.55	200.48	215.85	200.89	207.10	198.37	199.76	201.50	204.12	198.79	200.31
<b>0.01</b>	230.20	259.92	233.32	250.80	238.69	246.40	245.30	247.25	254.74	258.14	254.12	258.48
<b>0.02</b>	264.85	297.02	270.63	289.26	283.09	292.24	305.33	310.18	323.77	330.67	327.05	334.11
<b>0.03</b>	300.17	335.46	314.58	335.60	337.86	348.14	379.13	387.45	411.40	422.54	420.40	433.95
<b>0.04</b>	340.63	379.32	364.68	389.90	403.52	418.46	468.49	483.23	524.55	543.18	545.67	566.88
<b>0.05</b>	391.48	430.60	419.61	445.64	479.49	498.81	582.34	601.59	672.63	699.76	700.34	740.71
<b>0.06</b>	444.82	490.28	488.00	514.90	576.34	602.47	734.64	774.11	869.02	917.96	914.39	969.41
<b>0.07</b>	505.25	556.17	560.85	598.74	690.63	733.21	916.34	962.08	1118.55	1198.13	1184.84	1255.02
<b>0.08</b>	571.47	632.22	652.45	699.09	821.64	865.82	1149.49	1226.11	1451.93	1558.68	1563.68	1701.27
<b>0.09</b>	645.56	710.06	756.72	808.31	986.55	1052.87	1450.88	1552.55	1873.91	2030.57	2029.67	2219.08
<b>0.10</b>	733.35	812.77	875.92	955.38	1196.60	1295.37	1834.78	1987.42	2439.02	2684.75	2662.39	2917.61

Table 21: ARL and SDRL values of EWMA chart with outliers of magnitude  $\omega = 3$  and  $m = 1000$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	198.8	228.8	201.2	217.3	199.5	205.5	199.0	201.4	200.9	202.1	199.8	201.4
<b>0.01</b>	252.7	283.9	257.8	276.3	269.4	279.6	286.5	292.7	301.5	309.3	304.8	311.5
<b>0.02</b>	317.3	353.5	332.3	355.1	365.5	382.4	419.0	435.1	464.7	484.3	476.9	502.4
<b>0.03</b>	398.3	440.9	430.8	461.5	500.6	526.5	617.0	657.2	716.6	768.3	750.8	805.1
<b>0.04</b>	498.6	548.9	556.5	601.8	688.3	737.5	921.1	999.1	1130.3	1240.8	1197.8	1316.5
<b>0.05</b>	622.8	693.0	721.3	790.8	945.7	1021.7	1386.7	1535.7	1799.1	2022.8	1939.9	2193.3
<b>0.06</b>	777.9	873.8	942.7	1047.3	1309.1	1459.9	2131.5	2449.6	2876.5	3321.3	3168.4	3688.7
<b>0.07</b>	976.4	1121.2	1233.3	1396.9	1846.6	2116.8	3268.9	3805.3	4715.9	5628.2	5211.6	6241.6
<b>0.08</b>	1209.6	1416.7	1631.8	1892.6	2601.0	3017.7	5101.4	6088.0	7691.0	9237.1	8627.6	10273.1
<b>0.09</b>	1543.2	1865.7	2147.2	2563.3	3747.2	4505.9	8019.8	9578.8	12304.0	14033.2	13755.7	15434.7
<b>0.10</b>	1932.7	2384.0	2850.7	3513.4	5390.9	6604.1	12248.8	14155.7	18278.1	19296.2	19995.5	20582.6

Table 22: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 25$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	197.63	328.89	196.47	311.99	200.02	316.26	197.74	306.06	195.82	297.67	197.63	307.51
<b>0.01</b>	202.57	342.55	200.47	331.84	202.11	321.82	203.31	317.94	204.45	317.56	204.35	317.72
<b>0.02</b>	205.69	352.29	205.01	339.61	209.35	341.96	209.64	324.81	212.41	339.56	214.02	335.75
<b>0.03</b>	208.76	356.52	210.91	357.82	214.10	352.10	219.19	360.74	222.07	367.61	224.77	368.40
<b>0.04</b>	212.83	372.47	214.80	358.48	218.05	353.52	225.48	379.33	228.99	372.40	231.82	408.17
<b>0.05</b>	215.76	378.63	219.76	373.20	224.99	370.37	232.82	389.39	238.90	394.69	240.86	389.46
<b>0.06</b>	219.80	386.40	224.01	383.38	232.14	393.56	240.03	409.24	245.82	414.03	254.40	436.48
<b>0.07</b>	225.52	401.85	229.49	406.62	239.47	402.12	248.89	444.74	257.32	441.03	264.45	453.47
<b>0.08</b>	230.26	414.69	234.47	412.61	245.77	430.29	259.94	465.41	268.16	491.07	270.58	458.82
<b>0.09</b>	233.58	431.43	240.65	441.42	250.06	443.80	266.70	486.10	280.38	519.10	289.48	545.08
<b>0.10</b>	235.89	426.32	244.16	448.22	257.50	471.71	278.30	528.58	289.31	529.94	301.36	551.11

Table 23: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 25$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.61	335.23	195.72	319.13	197.11	309.95	195.75	302.23	194.11	301.81	195.66	299.98
<b>0.01</b>	202.76	340.03	203.25	329.06	204.80	326.38	204.56	325.06	207.04	322.53	207.55	331.51

0.02	209.08	363.00	207.73	350.76	212.73	347.79	213.51	342.47	216.66	344.82	219.83	358.47
0.03	213.47	371.35	212.77	360.44	218.33	363.56	223.13	374.66	230.02	389.59	232.17	392.36
0.04	217.63	379.53	219.63	387.20	227.61	396.72	235.42	408.33	241.89	410.68	245.13	436.41
0.05	221.65	392.34	226.05	387.37	236.85	412.21	243.33	416.69	254.62	444.90	259.53	453.96
0.06	226.32	408.81	230.11	404.12	243.03	429.91	258.63	464.63	267.50	465.51	276.53	477.54
0.07	235.44	434.87	240.39	442.26	254.89	512.49	274.60	527.06	287.84	571.94	295.29	588.53
0.08	240.19	453.35	247.51	469.87	264.86	519.41	284.64	551.49	305.23	614.26	313.17	602.44
0.09	248.84	498.59	257.82	493.42	277.29	535.54	301.22	613.53	324.44	651.35	331.49	658.25
0.10	254.25	493.49	260.28	499.42	282.86	557.95	315.90	647.71	345.49	738.93	365.39	834.87

Table 24: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 25$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.10	333.61	197.27	314.72	198.93	310.12	196.82	303.34	194.96	294.17	197.20	292.69
0.01	204.06	350.56	202.84	332.73	204.41	323.89	206.12	328.90	204.96	318.50	208.12	321.71
0.02	206.04	351.07	208.76	348.20	211.16	345.27	213.40	343.85	215.34	344.51	218.73	343.02
0.03	213.14	373.58	213.69	361.29	221.52	376.64	225.49	375.29	230.63	381.35	233.99	391.56
0.04	218.27	386.34	219.88	385.48	230.48	405.71	237.49	416.32	242.73	419.83	248.93	421.08
0.05	221.88	399.49	226.17	393.44	235.50	422.18	248.07	428.35	258.75	487.41	265.01	474.70
0.06	230.74	431.33	231.80	417.53	247.22	466.63	261.38	468.44	273.29	512.16	283.15	541.58
0.07	234.92	433.47	241.64	485.41	257.72	483.10	273.31	537.43	293.50	561.39	301.50	634.37
0.08	241.74	456.58	248.05	472.30	269.48	506.99	292.80	585.48	311.43	629.83	321.84	655.84
0.09	247.46	490.70	261.82	532.44	279.12	611.09	305.95	630.88	334.75	696.37	346.52	744.46
0.10	257.03	511.19	267.78	537.90	291.86	579.53	333.86	743.13	354.46	731.12	373.25	832.04

Table 25: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 50$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	197.97	276.94	198.75	264.69	197.37	251.30	199.18	248.65	196.16	241.10	198.02	244.35
0.01	202.50	281.73	200.48	267.27	203.54	260.55	203.67	253.34	203.56	255.56	204.18	250.25
0.02	204.63	288.77	204.79	272.54	207.34	267.95	209.52	262.23	211.68	267.20	212.46	264.17
0.03	208.68	298.31	208.96	281.40	212.98	273.33	217.14	280.33	219.56	276.28	221.46	278.28
0.04	212.81	303.62	212.68	286.89	218.20	288.43	223.91	286.25	225.94	286.36	229.66	290.45
0.05	216.66	306.87	216.33	295.99	223.49	295.29	229.77	293.86	233.40	299.87	238.53	303.36
0.06	219.14	315.30	222.44	305.53	230.27	305.36	237.42	309.09	244.89	316.19	249.14	320.64
0.07	224.66	319.90	227.70	316.84	234.15	310.80	245.01	317.67	251.39	322.24	260.75	342.00
0.08	226.54	326.74	232.71	322.92	241.24	325.74	253.67	335.09	261.37	342.94	267.66	352.12
0.09	232.04	334.14	236.64	330.41	245.69	330.64	262.48	348.86	271.18	363.48	282.63	375.96
0.10	235.74	343.27	241.62	342.43	250.77	340.30	270.64	365.76	284.86	378.66	293.19	393.21

Table 26: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 50$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.47	277.13	197.03	261.39	197.66	254.02	197.09	245.03	195.87	240.45	197.90	246.00
0.01	202.66	281.96	202.76	271.28	203.64	259.52	205.31	259.12	204.79	254.84	206.88	255.83
0.02	206.73	293.44	207.35	280.14	210.09	274.15	212.31	269.87	213.76	268.51	217.27	272.43
0.03	212.41	299.39	213.56	291.35	216.46	281.14	222.93	289.88	224.37	285.48	228.42	287.46
0.04	217.15	311.71	218.09	298.24	222.74	288.65	233.05	302.76	236.59	303.84	243.59	316.74
0.05	223.40	322.53	225.10	311.48	231.36	307.60	241.84	315.07	248.81	322.80	253.79	330.96
0.06	227.95	332.03	231.98	325.11	238.61	321.20	254.22	338.29	261.07	345.91	269.27	353.91
0.07	232.50	342.91	235.12	326.80	248.13	335.86	267.22	362.95	276.17	370.60	285.15	383.78
0.08	236.08	348.62	242.38	341.90	256.34	355.61	276.30	380.71	289.89	392.49	300.40	410.20
0.09	242.92	361.20	251.43	357.29	264.25	369.44	292.37	421.74	307.13	422.55	319.75	453.73
0.10	249.16	370.03	256.68	375.29	271.81	381.96	304.05	430.56	323.54	456.75	339.53	485.79

Table 27: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 50$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	196.90	259.81	198.55	279.10	196.68	250.95	196.58	241.48	196.34	243.91	197.27	242.92
0.01	201.70	266.56	201.93	283.19	204.25	260.88	205.90	256.02	204.87	256.96	206.70	257.17
0.02	208.27	281.45	207.22	290.54	208.63	269.85	213.83	275.02	215.40	277.25	219.05	278.68
0.03	213.46	291.27	213.92	305.82	216.65	283.34	222.82	286.45	227.37	288.91	230.19	297.35
0.04	217.85	297.12	216.38	310.09	226.19	299.45	232.18	301.58	238.99	310.10	241.72	313.89
0.05	224.83	312.29	220.85	317.70	233.68	310.54	244.67	324.27	249.70	326.52	259.39	345.09
0.06	232.56	327.80	226.09	329.99	242.08	327.69	255.65	346.46	265.23	353.80	270.77	365.28
0.07	241.10	345.34	234.86	347.58	248.34	344.69	266.93	361.17	280.75	389.33	289.72	396.07
0.08	245.73	350.01	240.12	354.98	260.05	365.24	282.73	395.74	297.23	416.67	306.45	427.38
0.09	251.70	365.11	247.39	374.73	196.68	250.95	296.85	422.32	315.58	455.12	326.09	455.23
0.10	260.95	383.71	251.17	380.21	204.25	260.88	311.67	449.02	334.77	479.42	348.92	515.80

Table 28: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 100$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.97	249.22	198.50	237.13	197.04	226.26	197.49	218.42	198.20	220.21	196.97	220.84
0.01	201.86	252.79	201.84	239.82	203.12	231.72	202.81	225.93	204.84	228.67	204.37	225.58
0.02	205.75	258.92	206.23	246.48	207.69	238.95	211.05	235.64	212.58	238.12	213.43	237.71
0.03	209.63	264.21	209.99	250.71	212.48	243.54	218.60	247.21	219.99	246.57	219.92	245.31
0.04	214.84	271.18	216.80	261.16	216.97	249.85	224.44	251.45	228.02	257.63	229.24	258.19
0.05	218.20	278.22	220.16	262.77	224.79	258.93	231.00	261.02	236.59	266.33	239.29	271.48
0.06	223.08	284.11	225.90	272.65	228.44	264.20	238.69	268.64	244.23	277.75	248.43	282.30
0.07	226.37	286.37	228.81	276.24	234.08	271.12	247.08	281.65	255.07	288.96	256.23	292.82
0.08	229.71	294.61	234.17	282.88	240.83	281.17	255.05	293.00	263.27	299.58	267.59	306.28
0.09	235.71	296.70	240.83	293.62	246.33	287.79	261.65	301.03	273.20	314.54	276.88	320.92
0.10	238.34	301.37	243.12	296.55	252.28	296.04	270.69	310.91	283.37	326.87	288.47	333.86

Table 29: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 100$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.00	249.28	199.92	236.42	198.50	226.41	198.14	219.94	198.24	220.51	196.14	217.63
0.01	204.21	258.42	205.10	245.65	203.45	232.33	205.84	229.47	206.45	231.25	206.94	229.30
0.02	209.37	262.10	209.74	252.65	209.89	240.53	213.82	241.03	217.06	244.17	218.41	246.00
0.03	211.97	268.97	214.64	255.19	216.48	247.51	223.51	251.45	226.60	253.33	227.74	257.18
0.04	219.22	276.40	219.70	265.29	223.88	258.92	232.41	264.33	237.97	270.24	237.93	269.68
0.05	222.69	281.92	224.94	269.71	231.40	269.45	242.32	276.85	249.76	286.43	252.60	289.97
0.06	228.08	288.92	232.36	282.63	240.13	281.87	253.63	290.64	261.68	301.97	266.33	306.04
0.07	232.53	298.39	238.89	292.18	247.94	292.75	264.89	306.08	274.89	317.73	279.64	323.84
0.08	240.08	307.11	244.54	300.00	256.25	304.63	274.29	317.89	288.93	331.32	292.38	338.20
0.09	243.30	312.87	252.31	310.70	265.02	316.31	290.01	339.24	307.00	358.36	312.67	370.56
0.10	252.02	328.53	259.63	322.35	274.66	331.41	301.76	355.55	323.68	385.45	331.54	389.96

Table 30: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 100$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.59	248.65	198.29	235.82	197.09	224.66	197.20	219.98	198.17	218.67	198.85	219.77
0.01	202.59	255.59	205.40	245.95	203.74	232.91	206.17	228.95	206.21	229.77	207.57	229.86
0.02	208.74	261.22	208.33	250.15	209.67	240.75	214.66	242.40	215.99	243.55	217.91	242.67
0.03	213.69	270.51	215.62	258.11	216.38	250.27	224.25	252.70	227.39	257.31	228.89	257.68
0.04	217.59	275.79	221.22	266.27	224.98	262.58	232.22	264.42	239.57	273.61	238.38	269.21
0.05	224.04	283.44	226.71	276.65	232.65	272.25	241.86	276.16	250.05	285.46	253.93	290.51
0.06	230.27	293.96	233.28	284.21	240.34	281.33	255.50	296.93	265.13	305.78	269.30	308.45
0.07	236.15	302.67	240.65	299.03	250.12	295.17	267.76	311.16	279.08	325.29	284.00	331.27
0.08	241.04	306.78	246.79	303.70	258.60	309.24	280.56	328.24	297.71	355.53	301.91	356.20

<b>0.09</b>	247.47	321.61	254.77	313.70	267.63	320.51	293.71	348.30	313.04	373.89	320.13	379.92
<b>0.10</b>	253.27	330.27	265.59	331.58	279.18	335.03	308.89	365.80	333.61	400.50	339.96	407.54

Table 31: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 500$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.02	229.97	199.42	217.39	198.29	206.21	198.11	201.82	198.38	201.34	198.73	201.83
<b>0.01</b>	203.25	234.11	202.52	220.12	204.83	212.79	205.64	210.60	205.65	210.20	206.78	211.19
<b>0.02</b>	209.52	241.13	206.56	225.32	210.73	219.20	211.80	215.43	212.33	216.70	213.43	217.86
<b>0.03</b>	211.84	244.49	212.35	229.40	215.12	223.73	217.23	221.55	220.00	225.12	220.84	225.35
<b>0.04</b>	215.82	247.60	215.44	233.28	221.66	229.65	223.82	228.75	228.98	233.16	229.15	234.33
<b>0.05</b>	221.78	252.62	220.72	240.31	226.63	235.27	233.25	236.65	236.19	242.56	237.87	243.51
<b>0.06</b>	226.67	259.93	224.59	244.28	232.68	242.55	240.21	245.26	244.48	248.75	247.47	254.11
<b>0.07</b>	229.70	262.49	231.52	252.22	239.76	250.10	245.88	251.61	253.47	260.07	256.73	263.26
<b>0.08</b>	234.03	267.81	236.43	256.33	244.88	252.86	255.98	262.12	263.49	271.39	266.83	274.38
<b>0.09</b>	237.82	270.21	242.41	262.73	251.88	260.73	262.14	269.04	272.30	278.43	277.26	284.06
<b>0.10</b>	244.84	279.44	246.68	268.00	257.22	267.76	272.06	279.21	284.42	292.25	288.79	296.90

Table 32: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 500$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	198.69	229.46	198.09	214.81	199.16	205.79	198.28	201.99	198.52	203.98	198.49	201.16
<b>0.01</b>	204.78	234.93	202.83	220.56	205.82	214.50	204.87	209.29	207.21	211.55	208.16	212.31
<b>0.02</b>	209.99	241.00	209.75	227.91	213.85	222.55	216.13	220.85	215.93	219.58	218.12	222.94
<b>0.03</b>	215.02	246.77	215.24	233.47	218.57	227.84	223.24	227.77	226.53	231.50	227.60	232.26
<b>0.04</b>	221.19	253.31	221.32	240.56	227.19	235.98	232.09	236.21	237.05	242.07	240.37	245.74
<b>0.05</b>	227.88	258.99	228.54	248.04	235.49	244.93	243.18	250.19	248.57	253.01	252.20	257.09
<b>0.06</b>	233.88	268.70	234.12	253.32	242.95	252.50	252.84	259.30	262.25	268.34	264.87	274.28
<b>0.07</b>	238.74	271.47	242.94	263.40	251.85	262.21	264.93	271.76	275.51	282.82	278.89	283.80
<b>0.08</b>	246.95	281.19	249.96	270.94	260.62	271.11	277.60	284.07	290.85	299.58	294.80	302.90
<b>0.09</b>	251.13	283.38	257.26	278.86	271.85	284.10	289.81	298.19	305.68	313.77	309.47	318.62
<b>0.10</b>	261.42	298.26	265.49	285.72	281.03	293.34	303.72	312.10	320.65	330.78	328.62	339.77

Table 33: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 500$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.04	229.77	197.38	214.89	199.03	206.42	198.54	203.12	197.23	201.09	198.75	202.80
<b>0.01</b>	203.88	235.89	202.75	221.12	204.11	212.78	207.32	211.07	207.86	212.18	205.44	209.50
<b>0.02</b>	208.00	240.73	208.89	228.47	211.76	219.91	215.91	219.91	216.36	220.33	217.49	221.22
<b>0.03</b>	215.53	248.42	215.74	233.62	218.59	226.87	225.33	230.95	227.35	231.97	229.11	234.79
<b>0.04</b>	220.45	252.64	222.62	240.72	227.04	236.14	234.46	240.64	238.02	245.00	241.07	246.85
<b>0.05</b>	227.28	258.49	228.16	248.01	235.13	246.12	244.27	251.91	251.65	257.19	253.76	257.99
<b>0.06</b>	235.28	269.82	235.98	254.83	246.41	258.18	254.69	259.98	265.26	270.58	268.20	276.65
<b>0.07</b>	240.96	274.32	243.24	263.80	254.48	265.60	266.23	272.06	278.72	283.84	281.74	289.53
<b>0.08</b>	246.59	281.22	249.54	268.44	265.32	275.57	280.58	288.23	294.63	305.23	299.77	307.51
<b>0.09</b>	255.64	288.94	260.66	281.36	274.33	287.16	295.02	302.33	308.87	316.76	317.94	330.47
<b>0.10</b>	262.96	296.59	268.41	289.96	286.43	300.44	309.82	321.24	328.33	338.68	336.64	343.83

Table 34: ARL and SDRL values of EWMA chart with Tukey outlier detection model  $m = 1000$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.17	229.31	198.05	214.74	198.32	204.81	197.47	200.24	197.92	199.71	197.90	199.58
<b>0.01</b>	203.54	232.98	203.44	218.69	204.65	211.55	202.45	203.34	204.86	205.40	204.85	206.33
<b>0.02</b>	206.92	237.16	208.39	224.70	208.46	214.12	210.32	213.03	212.62	213.90	211.86	214.39
<b>0.03</b>	211.06	240.45	212.24	228.41	214.63	221.06	216.11	218.73	220.75	223.28	219.58	221.04



0.00	197.57	327.06	196.66	315.55	198.74	311.48	195.42	301.33	196.09	297.93	195.46	315.96
0.01	204.82	346.67	202.82	332.42	205.48	326.73	204.95	318.56	205.75	320.45	208.87	324.33
0.02	208.16	357.78	208.38	348.70	212.30	342.55	214.82	350.95	217.75	352.12	219.35	353.19
0.03	214.43	379.42	215.06	367.41	220.60	366.60	225.17	387.98	228.75	399.69	232.83	382.51
0.04	217.56	387.37	219.61	379.18	228.20	396.10	236.66	415.32	244.01	420.70	245.33	405.81
0.05	224.41	399.11	225.62	395.29	236.36	411.12	245.39	422.08	254.11	498.92	263.98	463.11
0.06	228.93	425.34	233.31	415.44	244.25	429.13	259.35	478.94	269.28	476.93	278.04	499.80
0.07	236.21	462.87	239.53	441.92	254.27	465.56	274.37	525.54	283.94	537.29	297.72	595.71
0.08	240.61	445.63	245.20	451.27	263.55	486.79	289.88	590.21	306.65	629.50	316.25	628.26
0.09	248.39	473.80	255.79	480.22	277.80	552.34	300.55	641.84	324.40	663.73	336.12	680.20
0.10	253.04	506.53	265.70	514.14	288.00	575.68	320.10	674.22	348.43	764.94	363.84	780.90

Table 39: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 25$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.02	332.77	197.86	321.20	198.53	310.10	195.11	300.40	196.62	300.16	196.08	289.32
0.01	202.24	346.26	203.74	332.18	204.73	325.79	204.62	328.60	205.68	325.80	209.24	322.65
0.02	207.91	359.21	208.77	350.16	213.62	355.18	214.82	342.38	217.61	347.77	220.64	368.43
0.03	213.08	367.65	214.91	357.80	222.06	379.52	225.92	378.23	229.56	385.97	232.89	390.54
0.04	217.94	387.34	222.23	386.17	229.04	395.51	235.53	394.25	245.89	436.42	248.74	444.04
0.05	224.01	408.74	228.22	401.45	238.01	413.59	247.36	435.37	260.08	462.28	264.29	468.04
0.06	231.93	453.88	233.94	414.35	249.02	465.23	263.51	519.02	272.71	506.25	284.04	508.16
0.07	236.32	444.99	241.16	448.91	258.04	496.57	278.57	521.21	294.21	596.77	304.38	596.97
0.08	242.71	464.60	249.47	477.35	268.85	519.54	292.56	563.08	313.20	619.60	326.27	661.53
0.09	251.88	511.06	258.66	503.84	282.11	548.62	317.25	682.51	343.85	796.41	353.57	804.43
0.10	257.49	535.94	267.11	566.22	293.44	607.12	329.94	698.39	359.88	806.67	381.73	914.48

Table 40: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 50$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.19	274.74	197.79	261.38	198.51	253.44	197.64	244.17	195.66	241.95	197.35	242.00
0.01	200.24	279.65	201.78	270.32	201.44	258.78	204.16	254.32	203.61	252.05	202.86	252.16
0.02	206.34	291.94	205.31	274.64	207.77	266.94	209.74	263.71	209.86	264.66	213.27	264.68
0.03	209.03	294.70	209.06	280.65	211.30	272.45	216.90	278.33	218.41	272.65	224.13	285.06
0.04	212.19	297.67	212.94	287.43	217.11	282.32	223.52	285.15	228.26	296.93	228.69	288.09
0.05	217.43	309.96	218.21	296.69	223.58	294.20	230.49	296.77	234.68	299.94	240.40	308.94
0.06	218.32	312.73	222.03	303.23	228.49	300.02	237.08	309.24	244.61	325.14	248.58	320.31
0.07	225.97	323.71	228.31	316.47	234.98	312.81	246.60	324.01	253.35	330.57	258.98	339.57
0.08	230.08	334.11	231.49	318.21	241.54	327.07	255.86	343.91	262.17	343.99	270.45	351.93
0.09	232.96	338.98	238.29	335.57	245.03	329.56	262.57	347.92	272.50	360.34	277.44	368.48
0.10	238.06	344.15	239.88	334.30	255.93	349.92	272.10	363.47	284.32	390.57	293.55	391.99

Table 41: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 50$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	197.24	274.03	197.37	260.82	197.58	253.41	196.63	245.00	196.83	242.65	196.87	241.60
0.01	201.87	283.38	202.65	269.14	203.37	260.19	205.85	261.12	204.90	255.63	206.05	253.55
0.02	207.99	294.04	206.39	279.09	210.05	273.18	213.53	270.65	216.15	274.06	217.43	272.17
0.03	211.46	295.95	213.13	290.18	216.67	282.22	223.32	289.98	225.99	290.99	230.04	296.57
0.04	217.03	309.98	219.82	303.19	224.72	296.87	232.39	301.71	236.33	304.33	240.25	309.77
0.05	222.79	319.44	225.03	307.92	231.99	311.77	242.31	320.47	250.28	332.36	257.39	336.83
0.06	228.22	335.95	229.73	321.30	238.50	319.97	253.28	333.77	261.38	346.56	269.34	358.10
0.07	230.16	336.02	239.72	336.76	246.70	337.44	267.03	360.61	276.53	378.16	283.39	385.90
0.08	238.65	350.49	242.97	345.13	256.04	353.04	278.96	385.83	290.49	393.09	302.28	418.62
0.09	242.88	363.14	249.73	354.80	266.24	376.87	292.20	409.72	309.59	439.04	318.35	439.11
0.10	249.23	374.43	258.31	375.98	276.69	391.68	305.19	424.05	328.40	464.58	338.38	470.55

Table 42: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 50$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	197.74	278.74	197.66	261.01	196.51	248.20	197.25	245.30	196.26	242.83	197.21	244.98
0.01	203.19	284.59	201.96	268.56	202.95	259.52	206.37	257.68	207.10	260.92	206.49	257.76
0.02	207.61	292.79	206.54	280.55	210.64	273.17	213.28	269.43	215.07	274.23	216.71	270.91
0.03	210.03	293.59	213.64	291.62	216.81	286.12	223.21	286.81	227.06	291.79	230.95	294.92
0.04	217.91	311.65	219.07	299.03	224.64	297.81	233.18	305.03	238.30	311.89	243.60	314.48
0.05	221.70	318.10	226.26	310.92	233.48	313.38	244.54	320.76	252.63	335.08	259.05	348.47
0.06	227.22	329.48	230.73	320.04	240.00	327.41	255.78	345.88	267.81	360.54	273.09	371.85
0.07	235.71	348.78	238.83	338.90	250.09	340.95	269.23	366.63	278.93	380.29	289.83	392.34
0.08	236.34	345.38	246.26	354.45	260.84	368.44	282.17	390.83	296.98	415.72	307.27	430.94
0.09	246.90	367.93	254.16	368.88	269.42	380.28	296.02	422.40	317.40	450.50	327.61	462.26
0.10	252.41	382.63	261.93	385.22	279.85	403.01	314.80	462.00	338.24	494.37	351.96	520.13

Table 43: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 100$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.40	249.01	197.21	233.86	196.07	221.53	198.36	219.51	198.95	220.49	198.29	218.73
0.01	202.03	253.65	202.91	242.55	203.47	232.28	204.19	226.28	204.11	225.14	204.49	228.81
0.02	205.90	257.14	207.71	247.78	208.34	239.29	211.53	236.50	212.15	235.51	212.40	234.71
0.03	210.45	266.10	211.63	253.53	212.07	242.38	216.70	243.77	219.44	243.93	220.81	247.99
0.04	216.32	272.34	215.30	258.22	218.95	252.27	223.69	250.23	228.79	256.18	230.39	258.64
0.05	218.57	276.33	219.13	263.96	224.54	259.15	231.54	259.50	237.34	269.37	238.20	268.68
0.06	222.67	282.61	223.51	270.48	229.60	264.03	239.39	272.13	245.32	278.93	246.78	281.01
0.07	225.91	285.42	229.51	277.27	234.09	271.55	244.43	278.25	252.94	284.82	257.14	291.76
0.08	231.49	293.28	233.15	280.08	241.23	283.08	255.53	290.85	264.31	300.36	269.02	308.44
0.09	235.63	303.24	238.69	287.70	247.57	289.22	262.06	299.20	276.25	314.96	278.03	317.88
0.10	239.25	305.57	243.84	298.12	253.70	298.91	271.22	313.45	284.85	327.20	290.30	335.29

Table 44: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 100$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.72	250.11	200.70	237.89	196.53	223.09	197.33	219.61	197.84	219.28	198.48	219.82
0.01	204.97	257.01	204.24	242.74	203.63	232.04	206.16	229.73	207.58	229.19	205.78	227.19
0.02	209.32	265.44	208.37	249.41	211.04	241.94	214.74	241.39	215.50	240.98	217.17	242.49
0.03	214.24	271.62	215.13	258.81	217.61	250.22	222.51	251.19	226.47	256.97	227.11	253.94
0.04	218.72	277.73	220.11	263.55	223.74	259.93	233.20	264.32	237.46	268.65	238.46	271.17
0.05	225.23	284.33	226.57	275.72	230.51	269.41	241.63	273.69	250.65	286.59	251.95	287.91
0.06	230.27	294.16	231.02	277.86	239.77	280.28	252.68	290.69	262.00	300.61	267.62	306.86
0.07	235.02	300.13	239.39	292.75	247.63	290.27	264.18	305.61	276.35	319.09	278.58	317.91
0.08	241.26	313.22	246.96	303.48	257.27	304.67	277.17	324.72	292.89	341.18	295.62	343.39
0.09	247.20	319.48	252.88	312.04	266.48	316.48	288.36	338.77	309.06	363.34	313.19	368.44
0.10	253.57	328.05	260.96	325.92	275.57	329.41	304.20	358.79	324.83	385.24	332.88	394.77

Table 45: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 100$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.96	248.50	200.03	238.56	198.16	226.25	198.36	218.87	196.66	216.01	196.29	217.89
0.01	204.52	256.28	203.41	244.37	204.87	235.96	205.94	229.08	207.17	231.05	207.36	232.22
0.02	208.89	264.44	208.34	247.38	210.02	241.96	215.55	239.58	216.78	242.23	219.00	245.52
0.03	215.58	272.40	215.13	259.60	217.28	251.89	224.57	251.50	227.21	255.98	228.66	256.88
0.04	219.41	276.88	222.02	269.00	224.16	260.29	231.53	262.22	239.79	272.13	241.25	272.71
0.05	223.33	284.03	227.37	277.08	233.51	274.95	244.68	283.24	249.99	284.74	254.60	291.12
0.06	230.61	292.50	234.50	288.53	240.72	283.68	255.89	294.12	266.84	309.01	269.93	311.43
0.07	233.90	301.84	241.12	294.01	251.48	297.46	268.12	312.18	279.21	326.22	284.13	329.59

<b>0.08</b>	242.04	311.49	247.66	305.07	259.05	309.53	280.78	326.10	296.76	349.44	301.19	352.80
<b>0.09</b>	246.84	320.86	255.71	318.37	267.63	320.47	294.13	349.12	313.32	369.48	318.08	374.04
<b>0.10</b>	254.47	330.99	263.06	327.09	277.71	336.79	308.76	369.37	333.20	399.84	340.28	409.25

Table 46: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 500$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	199.92	230.48	196.98	214.63	198.81	206.73	198.29	202.05	197.68	200.03	199.03	201.04
<b>0.01</b>	205.71	236.88	202.75	219.79	204.80	212.03	205.19	209.30	204.46	208.66	205.64	209.98
<b>0.02</b>	207.09	238.29	206.91	225.84	209.05	216.72	210.88	214.54	212.38	217.76	214.18	218.13
<b>0.03</b>	210.95	240.98	211.28	229.25	213.72	222.91	218.10	223.66	219.36	223.36	221.93	227.37
<b>0.04</b>	215.09	246.75	215.46	234.10	219.90	229.34	224.20	229.51	227.95	233.57	229.82	233.55
<b>0.05</b>	220.89	251.99	221.22	238.79	227.06	235.10	231.96	237.74	236.19	241.39	238.21	243.33
<b>0.06</b>	225.15	256.21	225.67	244.86	231.57	241.42	236.95	240.23	244.10	248.77	248.31	254.21
<b>0.07</b>	229.07	262.14	230.65	248.88	238.49	246.48	246.56	252.46	254.20	259.72	256.93	263.27
<b>0.08</b>	235.06	268.68	235.94	255.92	243.85	254.39	255.25	260.78	264.08	269.96	269.37	274.73
<b>0.09</b>	239.93	273.46	240.35	261.12	249.93	259.85	264.85	272.83	272.97	281.62	279.44	286.18
<b>0.10</b>	244.34	275.88	245.68	264.87	259.00	269.85	273.11	280.76	284.17	291.55	287.92	296.24

Table 47: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 500$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	201.33	232.23	198.61	216.57	199.53	206.72	197.80	201.22	198.23	201.50	198.30	201.76
<b>0.01</b>	204.17	235.34	203.26	221.34	204.80	213.45	204.33	208.80	207.28	212.20	207.38	212.02
<b>0.02</b>	210.32	241.94	207.77	226.26	212.18	219.81	214.36	219.06	217.24	222.22	218.67	222.05
<b>0.03</b>	214.41	245.86	216.02	234.51	219.11	227.21	223.10	228.09	227.18	232.28	228.99	233.34
<b>0.04</b>	220.95	250.38	221.18	240.23	227.15	236.26	232.04	237.91	237.27	242.73	238.77	242.93
<b>0.05</b>	228.30	261.55	227.41	246.16	235.31	246.33	243.42	247.93	247.73	252.22	251.13	257.66
<b>0.06</b>	231.28	264.50	237.49	255.82	242.05	251.24	253.76	259.68	261.47	267.46	265.31	273.33
<b>0.07</b>	239.29	274.27	241.46	261.57	253.73	265.22	265.09	271.55	273.64	279.39	280.29	288.09
<b>0.08</b>	246.91	281.07	248.21	267.23	261.06	270.67	277.05	282.75	289.30	296.53	293.39	300.10
<b>0.09</b>	253.26	288.30	259.52	277.78	270.19	283.98	290.05	295.93	303.97	313.51	309.31	320.02
<b>0.10</b>	260.48	295.19	265.74	285.49	282.70	294.45	303.20	310.07	319.82	328.97	328.29	338.42

Table 48: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 500$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	198.69	228.84	198.19	215.52	199.19	207.68	197.46	200.83	197.80	199.98	198.60	201.81
<b>0.01</b>	204.62	235.83	202.53	220.57	206.88	214.39	207.18	212.07	206.75	210.13	206.58	211.82
<b>0.02</b>	210.11	242.17	208.19	225.97	212.79	221.08	214.53	219.16	216.62	220.32	218.66	223.44
<b>0.03</b>	214.70	246.07	216.70	233.62	219.13	229.62	223.28	228.21	226.29	231.51	228.31	232.72
<b>0.04</b>	222.43	253.91	221.79	239.76	226.84	234.39	233.65	238.91	237.83	242.15	240.88	247.65
<b>0.05</b>	226.75	260.55	230.04	249.57	237.20	248.08	242.78	249.47	251.29	256.80	254.14	262.18
<b>0.06</b>	233.72	266.39	237.00	256.67	244.31	250.70	255.37	261.70	263.92	270.70	268.53	274.10
<b>0.07</b>	242.00	277.65	245.03	265.27	255.84	267.05	268.94	275.01	279.11	286.37	281.75	290.64
<b>0.08</b>	248.12	283.03	250.39	270.20	263.95	275.37	282.26	289.30	295.12	305.59	298.11	306.91
<b>0.09</b>	254.58	289.28	259.16	279.01	273.77	286.03	293.65	301.17	310.46	319.84	318.25	328.48
<b>0.10</b>	263.75	299.05	268.41	289.46	286.14	297.81	308.67	318.73	328.98	341.06	336.25	347.33

Table 49: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 1000$  and  $\omega = 1$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
<b>0.00</b>	198.50	228.57	199.02	214.86	197.80	205.42	196.80	198.43	198.01	198.88	196.91	197.87
<b>0.01</b>	203.64	234.43	204.21	220.23	203.24	208.74	201.86	203.49	205.35	206.70	203.23	205.27
<b>0.02</b>	206.11	235.84	207.89	223.22	208.96	215.80	209.28	213.06	214.07	216.19	212.51	214.31

0.03	212.32	242.31	212.53	228.45	215.31	221.19	216.32	217.74	219.90	222.93	220.15	223.32
0.04	215.78	244.60	217.44	234.22	220.51	227.77	224.31	226.11	228.95	230.17	228.08	232.36
0.05	220.62	250.20	223.93	240.60	226.42	233.27	231.30	234.40	236.69	238.46	236.41	239.59
0.06	224.69	254.63	228.45	246.54	233.14	240.42	239.72	242.12	245.77	249.06	246.32	249.31
0.07	230.52	259.95	233.53	249.99	241.10	247.54	246.45	248.48	255.76	257.24	254.91	258.27
0.08	233.57	264.13	239.29	255.90	244.27	249.85	253.99	257.52	262.44	265.89	265.47	268.82
0.09	241.02	272.19	245.14	261.29	253.21	259.23	262.98	266.43	274.27	279.26	276.39	278.55
0.10	246.06	275.47	250.34	266.56	257.77	265.06	273.86	276.46	285.92	290.32	286.64	290.83

Table 50: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 1000$  and  $\omega = 2$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	198.78	227.22	197.60	214.56	199.91	206.45	198.23	199.37	197.80	199.77	196.94	198.40
0.01	204.14	233.74	203.72	220.06	205.76	213.03	205.19	207.56	207.30	208.45	208.10	209.90
0.02	208.53	239.35	210.68	226.09	211.98	219.06	212.81	214.71	217.26	218.93	216.77	218.64
0.03	216.15	245.93	217.22	233.78	219.93	226.80	221.97	225.25	227.09	229.12	226.36	228.05
0.04	221.91	251.98	222.78	236.88	226.81	234.13	232.12	234.12	238.10	240.52	238.91	242.35
0.05	228.23	258.72	230.46	247.60	234.57	240.67	241.79	245.49	250.64	253.88	251.47	253.81
0.06	235.96	265.75	236.19	252.22	244.17	248.94	252.50	254.93	262.48	265.22	263.36	266.58
0.07	240.12	271.21	245.78	262.98	252.67	258.87	265.64	268.45	274.23	277.07	277.70	280.38
0.08	248.50	279.62	252.86	270.20	261.39	268.49	276.22	279.79	288.29	291.49	292.00	296.57
0.09	255.46	285.76	261.56	280.27	271.75	280.01	287.94	293.72	304.01	308.71	310.99	317.53
0.10	262.61	292.96	271.10	289.84	283.11	291.59	304.53	309.21	320.93	325.27	324.64	329.53

Table 51: ARL and SDRL values of EWMA chart with MAD outlier detection model  $m = 1000$  and  $\omega = 3$

$\lambda$	0.03		0.05		0.1		0.25		0.5		0.75	
$\alpha$	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL	ARL	SDRL
0.00	199.39	229.91	198.33	213.18	197.98	203.79	198.15	200.42	198.31	200.32	196.79	199.05
0.01	204.32	234.64	203.99	220.62	205.83	212.18	205.36	208.71	206.36	207.74	206.06	206.48
0.02	210.82	241.99	211.23	227.15	212.38	219.58	213.54	215.83	216.75	219.29	215.28	217.76
0.03	216.26	247.67	217.13	233.76	219.43	227.05	222.49	225.38	227.49	228.21	227.54	230.12
0.04	221.86	251.35	223.69	241.13	227.74	233.13	232.56	235.23	238.40	241.10	238.53	241.47
0.05	228.84	260.28	231.13	247.93	236.27	243.35	243.03	246.63	250.16	251.59	251.82	253.89
0.06	233.76	264.91	238.44	254.58	245.99	252.99	253.31	256.76	262.91	267.68	264.90	267.16
0.07	242.16	272.83	246.82	264.18	255.31	261.59	264.77	269.41	278.39	282.27	280.18	284.45
0.08	251.67	282.04	255.77	272.05	263.76	270.65	279.93	284.03	292.41	296.02	295.69	299.96
0.09	257.28	290.62	265.59	281.75	276.79	285.73	295.72	300.33	309.99	313.38	315.68	320.39
0.10	265.93	298.48	274.52	292.69	287.87	295.19	310.88	315.32	328.15	330.56	332.21	339.75

Table 52: Flow width of silicon wafers measured from a semiconductor manufacturing process

	Sample	Subgroups				
	Phase-I Sample	1	18.75	16.67	13.75	12.00
	2	17.50	17.25	13.75	17.67	14.67
	3	21.75	15.75	15.00	19.25	16.33
	4	14.75	12.50	17.75	10.67	20.25
	5	18.00	16.67	17.67	12.80	19.25
	6	22.00	20.25	16.25	15.33	17.75
	7	16.00	12.00	18.25	12.00	14.75
	8	15.75	17.75	19.00	19.00	10.33
	9	18.75	16.25	14.00	21.00	22.33
	10	19.25	22.50	16.75	11.50	18.75
	11	11.33	13.00	16.50	19.50	19.25
	12	16.50	24.00	22.75	20.75	20.75
	13	20.50	14.50	16.75	17.25	13.33
	14	12.50	17.50	16.00	19.25	13.00
	15	12.25	14.75	11.00	17.25	8.33
	16	13.00	15.33	17.33	12.33	22.50

	17	26.75	17.75	22.75	16.00	11.75
	18	20.67	8.50	14.25	14.00	18.75
	19	18.00	10.50	11.67	16.67	18.00
	20	19.00	24.00	25.75	17.33	19.75
	21	19.75	16.00	12.50	16.75	17.50
	22	19.00	20.75	13.50	18.25	16.50
	23	14.00	13.00	19.00	16.00	11.25
	24	10.67	16.50	17.33	16.33	13.25
	25	22.25	13.75	20.75	21.00	16.75
Phase-II Samples	1	11.00	12.00	16.00	11.67	17.60
	2	12.00	13.25	11.25	12.00	13.25
	3	12.00	12.25	11.00	12.00	13.25
	4	16.33	11.75	18.00	9.75	15.00
	5	18.25	12.00	17.00	11.00	12.25
	6	4.50	16.75	13.67	8.25	15.00
	7	12.75	12.00	10.75	12.00	12.00
	8	11.50	12.33	6.67	10.00	2.67
	9	18.00	11.00	11.67	16.00	16.25
	10	18.75	9.75	13.00	12.00	16.50