Module 5:Understanding of applications of renewal theory, Stationary Process with discrete and continuous parameters

Lecture 22:Practical Application of Sequential Sampling Procedure

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Detailed simulation results

Normal Distribution: Table 5.1a shows the first set of simulation runs for SEL loss function for AS vs JC sequential sampling procedures with the following combinations of w=(0.008. 0.010), $\rho = (0.6, 0.7, 0.8)$ and m=10. On the other hand Table 5.1b contains the values of the simulation runs considering SEL case, for both BCJ vs BJC sequential sampling schemes with w=(0.008, 0.010), $\gamma = (\gamma_1 = 0.5, \gamma_2 = 0.6, \gamma_3 = 0.7), \rho = (\rho_1 = 0.7, \rho_2 = 0.8)$ and m=4 combination set. With a = +0.8 (over estimation being more penalized) the corresponding results for (i) AS vs JC and (ii) BCJ vs BJC are shown in Table 5.2a and Table 5.2b respectively. The combination of parameters used to illustrate these run results (i.e., Table 5.2a and Table 5.2b) are (i) w=(0.004, 0.006), r=(0.6, 0.7, 0.8), m=10 and (ii) w=(0.004, 0.006), $\gamma = (\gamma_1 = 0.5, \gamma_2 = 0.6, \gamma_3 = 0.7), \rho = (\rho_1 = 0.7, \rho_2 = 0.8)$, m=4, respectively. For the under estimation case ($a = -1.0$) the simulation results for (i) AS vs JC and (ii) BCJ vs BJC are depicted in Table 5.3a and Table 5.3b respectively. The combinations of parameter set w, r, g and m for $a = -1.0$ (Table 5.3a and Table 5.3b) are the same as that used in the run results shown in Table 5.2a and Table 5.2b ($a = +0.8$).

Exponential Distribution: With SEL function, Table 5.4a and Table 5.4b highlight the simulated estimates of different values of interest for AS vs JC (Table 5.4a) and BCJ vs BJC (Table 5.4b) methods respectively. The combinations of parameter choices, used in Table 5.4a are w=(0.009, 0.010),), $\rho = (0.6, 0.7, 08)$, m=10. While Table 5.4b shows the runs for the combination w=(0.009, 0.010),), $\gamma = (\gamma_1 = 0.7, \gamma_2 = 0.8, \gamma_3 = 0.9), \rho = (\rho_1 = 0.7, \rho_2 = 0.8)$, m=4. The corresponding different values of the estimates, when one considers over estimation, (a=+0.8), for the LINEX loss case, are depicted for the sequential sampling plans AS vs JC in Table 5.5a, for which the parameter combinations are w=(0.002, 0.003), $\rho = (0.6, 0.7, 0.8)$, m=10. On the other for BCJ vs BJC sequential sampling plans, which are depicted in Table 5.5b, the corresponding parameter set is w=(0.001, 0.002), $\gamma = (\gamma_1 = 0.7, \gamma_2 = 0.8, \gamma_3 = 0.9), \rho = (\rho_1 = 0.7, \rho_2 = 0.8)$, m=4. Furthermore Table 5.6a and Table 5.6b show the synopsis of the simulation results when a=-1.0, for the multi stage sampling methodologies, AS vs JC and BCJ vs BJC, respectively. The w, g, r and m values for these are the same as those for the LINEX loss overestimation instance (a=+0.8), i.e., Tables 5.5a and Table 5.5b.

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Gamma Distribution: Table 5.7a, Table 5.7b, Table 5.8a and Table 5.8b are the synopsis of the results when one takes into account the gamma distribution for AS vs JC (SEL), BCJ vs BJC (SEL), AS vs JC (LINEX, a=+0.8) and BCJ vs BJC (LINEX, a=+0.8) instances respectively. For the SEL (AS vs JC, i.e., Table 5.7a) example the values of the parameters one assumes are w=(0.01, 0.02), $\rho = (0.7, 0.8, 0.9)$, m=10. While for BCJ vs BJC under SEL (Table 5.7b) the corresponding values are w=(0.01, 0.02), $\gamma = (\gamma_1 = 0.6, \gamma_2 = 0.7, \gamma_3 = 0.8), \rho = (\rho_1 = 0.7, \rho_2 = 0.8)$, m=4. When we switch over to the LINEX loss case, with a=+0.8, Table 5.8a summarizes the comparison of AS vs JC, for which we consider the parameter values, as w=(0.01, 0.02), $\rho = (0.7, 0.8, 0.9)$, m=10. Finally the BCJ vs BJC comparison results are highlighted in Table 5.8b with w=(0.01, 0.02), $\gamma = (\gamma_1 = 0.7, \gamma_2 = 0.8, \gamma_3 = 0.9)$, $\rho = (\rho_1 = 0.7, \rho_2 = 0.8)$, m=10 as the parameter set for a=+0.8.

Extreme Value Distribution: The final two sets of tables, i.e., Table 5.9a, Table 5.9b and Table 5.10a, Table 5.10b highlight the findings for the simulation runs when the distribution is extreme valued. For the SEL bounded risk example, one considers a combination of (i) w=(0.007, 0.008), $\rho = (0.6, 0.7, 0.8)$, m=10 and (ii) w=(0.007, 0.008), $\gamma = (\gamma_1 = 0.5, \gamma_2 = 0.6, \gamma_3 = 0.7)$, $\rho = (\rho_1 = 0.6, \rho_2 = 0.7)$, m=10 to evaluate the performance of (i) AS vs JC (Table 5.9a) and (ii) BCJ vs BJC (Table 5.9b) multi stage sampling methods respectively. We assume the asymmetric, i.e., LINEX, loss function with a fixed level of bounded risk, i.e., w=+0.05. Our aim is to study the effect of change of a, i.e., shape parameter of the LINEX loss, on the sample size as well as on the estimate of E(X) (which is of interest to us). The results are highlighted in Table 5.10a (AS vs JC) and Table 5.10b (BCJ vs BJC). For the AS vs JC simulation runs, the parameters vectors are a=(+0.5,+1.0), $\rho = (0.5, 0.7, 0.9)$, m=10, while a=(+0.5,+1.0), $\gamma = (\gamma_1 = 0.5, \gamma_2 = 0.6, \gamma_3 = 0.7)$, $\rho = (\rho_1 = 0.6, \rho_2 = 0.7)$, m=10 are the corresponding values of parameters for BCJ vs BJC sampling procedure

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Table 5.1 (a) & (b): Simulation results for X~N(μ=10, σ^2=1) , i.e., Normal Distribution, with SEL function, B=100, K=1000 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.5, γ_2=0.6, γ_3=0.7, m=4 sequential sampling procedures

w	ρ	D	$\bar{N}$		$\bar{SO}$		$\bar{R}$		$\hat{\mu}_N = \bar{X}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.008	0.6	126	74	124	64	114	0.013172	0.007946	9.996341	9.998960	522.83	851.86
	0.7		86	124	76	114	0.011313	0.007946	10.001254	10.000606	599.20	848.00
	0.8		99	124	89	114	0.009913	0.007946	9.999738	10.000087	680.16	853.53
0.010	0.6	101	59	99	49	89	0.016408	0.009915	9.998820	10.001149	493.45	678.27
	0.7		69	99	59	89	0.014102	0.009915	10.002488	9.998018	482.06	675.34
	0.8		79	99	69	89	0.012361	0.009914	9.998432	9.999236	544.48	689.47

w	D	$\bar{N}$		$\bar{SO} = \bar{SO}_1 + \bar{SO}_2 + \bar{SO}_3$		$\bar{R}$		$\hat{\mu}_N = \bar{X}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.008	126	85	124	75=35+15+25	120=77+14+29	0.011780	0.007946	9.995904	9.998626	184.89	960.05
0.010	101	67	99	57=26+11+20	95=61+12+22	0.014879	0.009914	9.997748	9.999248	175.08	753.06

Table 5.2 (a) & (b): Simulation results for X~N(μ=10, σ^2=1), i.e., Normal Distribution, with LINEX loss function, B=100, K=1000, a=+0.8 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.9, γ_1=0.3, γ_2=0.5, γ_3=0.7, m=4 sampling procedures

w	ρ	D	$\bar{N}$		$\bar{SO}$		$\bar{R}$		$\hat{\mu}_N = \bar{X}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.004	0.6	81	47	79	37	69	0.000025	0.000017	10.001017	10.000107	347.36	568.03
	0.7		55	79	45	69	0.000023	0.000017	9.998713	9.999260	401.17	568.13
	0.8		63	79	53	69	0.000021	0.000017	10.000788	10.000520	461.73	567.50
0.006	0.6	54	31	52	21	42	0.000038	0.000025	10.000929	9.997193	242.39	376.36
	0.7		36	52	26	42	0.000034	0.000025	10.000178	9.999643	272.16	381.64
	0.8		41	52	31	42	0.000031	0.000026	10.002220	10.001867	313.63	380.84

w	D	$\bar{N}$		$\bar{SO} = \bar{SO}_1 + \bar{SO}_2 + \bar{SO}_3$		$\bar{R}$		$\hat{\mu}_N = \bar{X}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.004	81	53	79	43=8+16+19	75=46+18+11	0.000022	0.000017	9.999058	10.000127	160.11	633.58
0.006	54	35	52	25=3+10+12	48=27+12+9	0.000033	0.000026	9.999793	10.001627	152.83	438.73

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Table 5.3 (a) & (b): Simulation results for X~N(μ=10, σ^2=1), i.e., Normal Distribution, with LINEX loss function, B=100, K=1000, a=-1.0 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.9, γ_1=0.3, γ_2=0.5, γ_3=0.7, m=4 sequential sampling procedures

w	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{R}}$		$\hat{\mu}_N = \bar{\bar{X}}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.004	0.6	126	74	124	64	114	0.000025	0.000017	10.001221	9.996907	536.88	906.17
	0.7		87	125	77	114	0.000023	0.000017	10.001031	10.000459	629.58	907.88
	0.8		99	124	89	114	0.000021	0.000017	10.000290	9.997936	727.95	910.55
0.006	0.6	84	49	83	39	73	0.000038	0.000025	10.000313	10.000111	357.80	599.24
	0.7		57	83	47	73	0.000034	0.000025	9.998714	9.995758	418.66	600.52
	0.8		66	82	56	72	0.000031	0.000025	10.002332	10.003020	483.52	599.86

w	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{\bar{R}}$		$\hat{\mu}_N = \bar{\bar{X}}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.004	126	84	124	74=17+25+32	120=77+27+16	0.000022	0.000018	10.002424	9.999272	173.74	965.34
0.006	84	55	82	45=9+16+20	78=48+18+12	0.000033	0.000026	10.003427	10.002528	158.03	655.22

Table 5.4 (a) & (b): Simulation results for X~E(σ = 10, λ = 4), i.e., Exponential Distribution, with SEL function, B=100, K=1000 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC)) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.7, γ_2=0.8, γ_3=0.9, m=4 sequential sampling procedures

w	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{R}}$		$\hat{\lambda}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.009	0.6	106	89	148	79	138	0.024618	0.008920	4.000008	4.000019	660.753	1036.199
	0.7		104	148	94	138	0.018127	0.008920	4.000028	4.000011	758.332	1053.812
	0.8		119	148	109	138	0.013902	0.008920	4.000003	4.000016	853.055	1042.204
0.010	0.6	101	85	141	75	131	0.027332	0.009907	4.000029	4.000006	627.432	990.366
	0.7		99	141	89	131	0.020128	0.009906	4.000005	4.000012	735.079	989.601
	0.8		113	141	103	131	0.015438	0.009907	4.000021	4.000010	813.555	993.127

w	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{\bar{R}}$		$\hat{\lambda}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.009	106	133	148	123=63+23+37	144=95+16+33	0.011112	0.008920	4.000014	4.000003	270.614	1112.202
0.010	101	126	141	116=59+21+36	137=92+16+29	0.012351	0.009907	4.000011	4.000003	269.163	1062.828

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Table 5.5 (a) & (b): Simulation results for X~E(σ = 10, λ = 4), i.e., Exponential Distribution, with LINEX loss function, B=100, K=1000, a=+0.8 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.7, γ_2=0.8, γ_3=0.9, m=4 sequential sampling procedures

w	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{R}}$		$\bar{\bar{\hat{\lambda}}}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.002	0.6	183	109	182	99	172	0.005645	0.001983	4.000003	4.000007	961.584	1617.564
	0.7		127	182	117	172	0.004111	0.001983	4.000009	4.000000	1123.606	1617.564
	0.8		146	182	136	172	0.003127	0.001983	4.000001	4.000024	1295.689	1621.090
0.003	0.6	151	89	151	79	141	0.008501	0.002969	4.000008	4.000002	790.686	1313.239
	0.7		104	149	94	139	0.006177	0.002969	4.000004	4.000006	922.662	1310.743
	0.8		119	149	109	139	0.004691	0.002969	4.000008	4.000004	1054.965	1314.612

w	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{\bar{R}}$		$\bar{\bar{\hat{\lambda}}}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.001	258	230	256	220=104+51+65	252=172+27+53	0.001249	0.000994	4.000005	4.000009	359.362	2466.001
0.002	183	162	182	152=72+35+45	178=118+20+40	0.002514	0.001983	4.000005	4.000003	315.666	1704.051

Table 5.6 (a) & (b): Simulation results for X~E(σ = 10, λ = 4), i.e., Exponential Distribution, with LINEX loss function, B=100, K=1000, a=-1.0 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.7, γ_2=0.8, γ_3=0.9, m=4 sequential sampling procedures

w	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{R}}$		$\bar{\bar{\hat{\lambda}}}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.002	0.6	219	130	218	120	208	0.005335	0.001986	4.000007	4.000002	1168.581	1959.376
	0.7		152	218	142	208	0.003966	0.001987	4.000005	4.000009	1347.637	1958.830
	0.8		174	218	164	208	0.003064	0.001986	4.000009	4.000002	1563.136	1956.240
0.003	0.6	178	106	177	96	167	0.007934	0.002975	4.000008	4.000007	944.144	1560.436
	0.7		124	177	114	167	0.005913	0.002975	4.000005	4.000009	1086.961	1569.314
	0.8		141	177	131	167	0.004577	0.002975	4.000003	4.000031	1247.766	1556.194

w	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{\bar{R}}$		$\bar{\bar{\hat{\lambda}}}_N = \min_{\forall N}\{\min(\hat{\lambda})\}$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.001	312	279	311	269=128+62+79	307=208+33+66	0.001238	0.000995	4.000002	4.000009	402.075	3065.088
0.002	219	195	218	185=87+43+55	214=144+24+46	0.002480	0.001987	4.000031	4.000009	331.547	2065.394

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Table 5.7 (a) & (b): Simulation results for X~G(α = 5,β = 1, γ = 0), i.e., Gamma Distribution, with SEL function, B=100, K=1000, m = 10, considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.6, γ_2=0.7, γ_3=0.8, m=4 sequential sampling procedures

w	ρ	D	$\bar{N}$		$\bar{SO}$		$\bar{R}$		$\bar{\hat{\alpha}}_N = \bar{X}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.01	0.7	501	350	501	340	491	0.014298	0.009988	4.991384	4.996036	809.984	1181.718
	0.8		400	501	390	491	0.012510	0.009988	4.999725	4.996925	935.907	1188.703
	0.9		449	501	439	491	0.011151	0.009988	4.997953	4.998963	1076.484	1183.906
0.02	0.7	251	175	251	165	241	0.028630	0.019952	4.992816	4.998004	404.203	578.156
	0.8		200	251	190	241	0.025047	0.019952	4.993773	4.997757	459.969	574.734
	0.9		225	251	215	241	0.022260	0.019952	4.994360	4.992071	517.390	573.282

w	D	$\bar{N}$		$\bar{SO} = \bar{SO}_1 + \bar{SO}_2 + \bar{SO}_3$		$\bar{R}$		$\bar{\hat{\alpha}}_N = \bar{X}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.01	501	404	501	394=203+71+120	497=342+52+103	0.012406	0.009988	5.003337	4.999364	178.828	1240.812
0.02	251	201	251	191=96+35+60	247=167+27+53	0.024956	0.019953	4.994732	4.998398	114.406	613.516

Table 5.8 (a) & (b): Simulation results for X~G(α = 5,β = 1, γ = 0), i.e., Gamma Distributions, with LINEX loss function, B=100, K=1000, a=+0.8 considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.7, ρ_2=0.8, γ_1=0.7, γ_2=0.8, γ_3=0.9, m=10 sequential sampling procedures

w	ρ	D	$\bar{N}$		$\bar{SO}$		$\bar{R}$		$\bar{\hat{\alpha}}_N = \bar{X}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.01	0.7	322	227	322	217	312	-0.999273	-0.999658	4.899971	4.996633	570.893	821.9422
	0.8		257	322	247	312	-0.999657	-0.999659	4.998107	4.999112	663.940	797.3391
	0.9		288	322	278	312	-0.999657	-0.999661	4.997129	5.001849	710.5567	815.2728
0.02	0.7	162	113	162	103	152	-0.999646	-0.999650	4.993756	4.991776	309.0546	419.6498
	0.8		129	162	119	152	-0.999647	-0.999651	4.992525	4.994285	340.6197	414.6433
	0.9		145	162	135	152	-0.999651	-0.999649	4.995651	4.990083	383.6076	412.4438

w	D	$\bar{N}$		$\bar{SO} = \bar{SO}_1 + \bar{SO}_2 + \bar{SO}_3$		$\bar{R}$		$\bar{\hat{\alpha}}_N = \bar{X}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.01	322	290	322	280=149+49+82	312=216+32+64	-0.999657	-0.999660	4.996630	5.001139	156.4205	821.8930
0.02	162	146	162	136=70+24+42	152=103+17+32	-0.999649	-0.999650	4.992363	4.992775	112.2666	418.4169

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Lecture 22:Practical Application of Sequential Sampling Procedure

Table 5.9 (a) & (b): Simulation results for X~EVD(μ = 3, σ = 1), i.e., Distributions, with SEL function, B=100, K=1000, m = 10, considering (a) Accelerated Sequential (AS), Jump & Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.6, ρ_2=0.7, γ_1=0.5, γ_2=0.6, γ_3=0.7, m=10 sequential sampling procedures

w	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{R}}$		$\bar{\bar{\hat{E}(X)}} = \mu + \gamma^* \bar{\bar{\hat{\sigma}}}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC	AS	JC
0.007	0.6	235	228	384	218	374	0.011672	0.006985	3.731245	3.735142	838.719	1467.141
	0.7		266	384	256	374	0.010004	0.006984	3.732031	3.735685	987.579	1471.593
	0.8		306	383	296	373	0.008753	0.006984	3.734643	3.736172	1142.735	1465.781
0.008	0.6	206	199	334	189	324	0.013340	0.007980	3.729973	3.733215	734.719	1265.578
	0.7		233	335	223	325	0.011434	0.007980	3.731583	3.733679	860.344	1264.047
	0.8		267	337	257	327	0.010005	0.007980	3.733409	3.735939	991.250	1272.703

w	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{R}$		$\bar{\bar{\hat{E}(X)}} = \mu + \gamma^* \bar{\bar{\hat{\sigma}}}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
0.007	235	268	383	258=107+56+95	373=213+42+118	0.010149	0.006985	3.731585	3.734956	152.047	1501.125
0.008	206	234	335	224=93+48+83	325=190+35+100	0.011676	0.007980	3.731271	3.733650	140.000	1286.406

Table 5.10 (a) & (b): Simulation results for X~EVD(μ = 5, σ = 95), i.e., Distributions, with' LINEX loss function, B=100, K=1000, w=+0.05 considering (a) Accelerated Sequential (AS), Jump and Crawl (JC) with m=10 and (b) Batch Crawl & Jump (BCJ), Batch Jump & Crawl (BJC) with ρ_1=0.6, ρ_2=0.7, γ_1=0.5, γ_2=0.6, γ_3=0.7, m=10 sequential sampling procedures

a	ρ	D	$\bar{\bar{N}}$		$\bar{\bar{SO}}$		$\bar{\bar{\hat{E}(X)}} = \mu + \gamma^* \bar{\bar{\hat{\sigma}}}_N$		CPU time (seconds)	
			AS	JC	AS	JC	AS	JC	AS	JC
+0.5	0.5	36	22	44	12	34	70.944758	72.993731	921.214	2474.927
	0.7		31	44	21	34	72.267342	73.143197	1550.071	2431.346
	0.9		40	44	30	34	72.934863	72.998988	2162.724	2436.554
+1.0	0.5	62	37	74	27	64	72.975407	74.213237	1948.064	4677.936
	0.7		52	74	42	64	73.672788	74.155536	3112.121	4588.755
	0.9		67	74	57	64	74.089739	74.150556	4024.412	4792.011

a	D	$\bar{\bar{N}}$		$\bar{\bar{SO}} = \bar{\bar{SO}}_1 + \bar{\bar{SO}}_2 + \bar{\bar{SO}}_3$		$\bar{\bar{\hat{E}(X)}} = \mu + \gamma^* \bar{\bar{\hat{\sigma}}}_N$		CPU time (seconds)	
		BCJ	BJC	BCJ	BJC	BCJ	BJC	BCJ	BJC
+0.5	36	30	44	20=4+5+11	34=16+5+13	72.166052	73.122859	528.010	2745.722
+1.0	62	51	74	41=12+9+20	64=34+8+22	73.643506	74.146519	592.107	4895.464

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