A Diversity-Aware Memetic Algorithm for the Linear Ordering Problem: Improving Best-Known Solutions for Standard Benchmarks

Supplementary Material

Lázaro Lugo [1], Carlos Segura[2], Gara Miranda[3]

[1−2]Centro de Investigación en Matemáticas (CIMAT), Área de Computación, Callejón Jalisco s/n, Mineral de Valenciana, Guanajuato, Guanajuato 36240, Mexico,

[3]Departamento de Ingeniería Informática y de Sistemas. Universidad de La Laguna. Avda. Astrofísico Francisco Sánchez, s/n. 38200. San Cristóbal de La Laguna. Santa Cruz de Tenerife. España.

{[1]`lazaro.perez`, [2]`carlos.segura`}`@cimat.mx`, [3]`gmiranda@ull.edu.es`

This supplementary material provides details on the results obtained with ILSr, MAr, CD-RVNS and MA-EDM. The algorithms were run for a period of four hours with nine instance packages: IO, MB, SGB, Spec, RandB, RandA1, RandA2, xLOLIB and xLOLIB2. The following tables show, for each method and instance, the best result attained and the best-known solution (BKS) prior to this research. Additionally, in the case of MA-EDM, the mean and worst solutions are also shown. The cases where the BKS is attained are shown in bold face. Moreover, those cases where a new BKS is found are indicated with an asterisk. Note that MA-EDM allowed the generation of 293 new BKSs. Note that for each instance the BKS generated in this research is available in the repository `https://github.com/carlossegurag/LOP_MA-EDM` in the BKS.zip file.

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IO(1/2)

Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-be75eec	236464	236464	236464	236464	236464	236464	236464
N-be75np	716994	716994	716994	716994	716994	716994	716994
N-be75oi	111171	111171	111171	111171	111171	111171	111171
N-be75tot	980516	980516	980516	980516	980516	980516	980516
N-stabu70	362512	362512	362512	362512	362512	362512	362512
N-stabu74	541393	541393	541393	541393	541393	541393	541393
N-stabu75	553303	553303	553303	553303	553303	553303	553303
N-t59b11xx	209320	209320	209320	209320	209320	209320	209320
N-t59d11xx	147354	147354	147354	147354	147354	147354	147354
N-t59f11xx	122520	122520	122520	122520	122520	122520	122520
N-t59i11xx	8261545	8261545	8261545	8261545	8261545	8261545	8261545
N-t59n11xx	20928	20928	20928	20928	20928	20928	20928
N-t65b11xx	356758	356758	356758	356758	356758	356758	356758
N-t65d11xx	237739	237739	237739	237739	237739	237739	237739
N-t65f11xx	217295	217295	217295	217295	217295	217295	217295
N-t65i11xx	14469163	14469163	14469163	14469163	14469163	14469163	14469163
N-t65l11xx	16719	16719	16719	16719	16719	16719	16719
N-t65n11xx	32157	32157	32157	32157	32157	32157	32157
N-t65w11xx	138181029	138181029	138181029	138181029	138181029	138181029	138181029
N-t69r11xx	771149	771149	771149	771149	771149	771149	771149
N-t70b11xx	528419	528419	528419	528419	528419	528419	528419
N-t70d11xx	376725	376725	376725	371597	376725	366469	376725
N-t70d11xxb	366469	366469	366469	366469	366469	366469	366469
N-t70f11xx	360336	360336	360336	360336	360336	360336	360336
N-t70i11xx	24785782	24785782	24785782	24785782	24785782	24785782	24785782
N-t70k11xx	60659200	60659200	60659200	60659200	60659200	60659200	60659200
N-t70l11xx	25253	25253	25253	25253	25253	25253	25253
N-t70n11xx	52704	52704	52704	52704	52704	52704	52704
N-t70u11xx	21716400	21716400	21716400	21716400	21716400	21716400	21716400
N-t70w11xx	224319954	224319954	224319954	224319954	224319954	224319954	224319954
N-t70x11xx	283808865	283808865	283808865	283808865	283808865	283808865	283808865
N-t74d11xx	566089	566089	566089	566089	566089	566089	566089

Table 1: Experimental result with IO package (1/2)

	IO(2/2)						
	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
Instance	Best	Best	Best	Mean	Best	Worst	
N-t75d11xx	578304	578304	578304	578304	578304	578304	578304
N-t75e11xx	2739219	2739219	2739219	2739219	2739219	2739219	2739219
N-t75i11xx	63567735	63567735	63567735	63567735	63567735	63567735	63567735
N-t75k11xx	108844	108844	108844	108844	108844	108844	108844
N-t75n11xx	93777	93777	93777	93777	93777	93777	93777
N-t75u11xx	52708323	52708323	52708323	52708323	52708323	52708323	52708323
N-tiw56n54	91554	91554	91554	91554	91554	91554	91554
N-tiw56n58	125224	125224	125224	125224	125224	125224	125224
N-tiw56n62	176715	176715	176715	176715	176715	176715	176715
N-tiw56n66	226547	226547	226547	226547	226547	226547	226547
N-tiw56n67	226033	226033	226033	226033	226033	226033	226033
N-tiw56n72	365146	365146	365146	365146	365146	365146	365146
N-tiw56r54	102948	102948	102948	102948	102948	102948	102948
N-tiw56r58	129568	129568	129568	129568	129568	129568	129568
N-tiw56r66	209491	209491	209491	209491	209491	209491	209491
N-tiw56r67	222810	222810	222810	222810	222810	222810	222810
N-tiw56r72	270663	270663	270663	270663	270663	270663	270663
N-usa79	1813986	1813986	1813986	1813986	1813986	1813986	1813986

Table 2: Experimental result with IO package (2/2)

				MB			
Instance	ILSr	MAr	CD-RVNS	MA-EDM			Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-r100a2	**145270**	**145270**	**145270**	145270.0	**145270**	145270	**145270**
N-r100b2	**143271**	**143271**	**143271**	143271.0	**143271**	143271	**143271**
N-r100c2	**141702**	**141702**	**141702**	141702.0	**141702**	141702	**141702**
N-r100d2	**142630**	**142630**	**142630**	142630.0	**142630**	142630	**142630**
N-r100e2	**147416**	**147416**	**147416**	147416.0	**147416**	147416	**147416**
N-r150a0	**360978**	**360978**	**360978**	360978.0	**360978**	360978	**360978**
N-r150a1	**349251**	**349251**	**349251**	349251.0	**349251**	349251	**349251**
N-r150b0	**367635**	**367635**	**367635**	367635.0	**367635**	367635	**367635**
N-r150b1	**347627**	**347627**	**347627**	347627.0	**347627**	347627	**347627**
N-r150c0	**363895**	**363895**	**363895**	363895.0	**363895**	363895	**363895**
N-r150c1	**346492**	**346492**	**346492**	346492.0	**346492**	346492	**346492**
N-r150d0	**363180**	**363180**	**363180**	363180.0	**363180**	363180	**363180**
N-r150d1	**348902**	**348902**	**348902**	348902.0	**348902**	348902	**348902**
N-r150e0	**367181**	**367181**	**367181**	367181.0	**367181**	367181	**367181**
N-r150e1	**349910**	**349910**	**349910**	349910.0	**349910**	349910	**349910**
N-r200a0	**654604**	**654604**	**654604**	654604.0	**654604**	654604	**654604**
N-r200a1	**616399**	**616399**	**616399**	616399.0	**616399**	616399	**616399**
N-r200b0	**651237**	**651237**	**651237**	651237.0	**651237**	651237	**651237**
N-r200b1	**622112**	**622112**	**622112**	622112.0	**622112**	622112	**622112**
N-r200c0	**657441**	**657441**	**657441**	657441.0	**657441**	657441	**657441**
N-r200c1	**611956**	**611956**	**611956**	611956.0	**611956**	611956	**611956**
N-r200d0	**654375**	**654375**	**654375**	654375.0	**654375**	654375	**654375**
N-r200d1	**616617**	**616617**	**616617**	616617.0	**616617**	616617	**616617**
N-r200e0	**645207**	**645207**	**645207**	645207.0	**645207**	645207	**645207**
N-r200e1	**611306**	**611306**	**611306**	611306.0	**611306**	611306	**611306**
N-r250a0	**1019120**	**1019120**	**1019120**	1019120.0	**1019120**	1019120	**1019120**
N-r250b0	**1013737**	**1013737**	**1013737**	1013737.0	**1013737**	1013737	**1013737**
N-r250c0	**1010961**	**1010961**	**1010961**	1010961.0	**1010961**	1010961	**1010961**
N-r250d0	**1015041**	**1015041**	**1015041**	1015041.0	**1015041**	1015041	**1015041**
N-r250e0	**1008267**	**1008267**	**1008267**	1008267.0	**1008267**	1008267	**1008267**

Table 3: Experimental result with MB package

		SGB					
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-sgb75.01	**2724126**	**2724126**	**2724126**	2724126.0	**2724126**	2724126	**2724126**
N-sgb75.02	**2616392**	**2616392**	**2616392**	2616392.0	**2616392**	2616392	**2616392**
N-sgb75.03	**2747384**	**2747384**	**2747384**	2747384.0	**2747384**	2747384	**2747384**
N-sgb75.04	**2734169**	**2734169**	**2734169**	2734169.0	**2734169**	2734169	**2734169**
N-sgb75.05	**2707863**	**2707863**	**2707863**	2707863.0	**2707863**	2707863	**2707863**
N-sgb75.06	**2707280**	**2707280**	**2707280**	2707280.0	**2707280**	2707280	**2707280**
N-sgb75.07	**2727928**	**2727928**	**2727928**	2727928.0	**2727928**	2727928	**2727928**
N-sgb75.08	**2712837**	**2712837**	**2712837**	2712837.0	**2712837**	2712837	**2712837**
N-sgb75.09	**2687364**	**2687364**	**2687364**	2687364.0	**2687364**	2687364	**2687364**
N-sgb75.10	**2733387**	**2733387**	**2733387**	2733387.0	**2733387**	2733387	**2733387**
N-sgb75.11	**2732686**	**2732686**	**2732686**	2732686.0	**2732686**	2732686	**2732686**
N-sgb75.12	**2692548**	**2692548**	**2692548**	2692548.0	**2692548**	2692548	**2692548**
N-sgb75.13	**2714591**	**2714591**	**2714591**	2714591.0	**2714591**	2714591	**2714591**
N-sgb75.14	**2733926**	**2733926**	**2733926**	2733926.0	**2733926**	2733926	**2733926**
N-sgb75.15	**2732810**	**2732810**	**2732810**	2732810.0	**2732810**	2732810	**2732810**
N-sgb75.16	**2747797**	**2747797**	**2747797**	2747797.0	**2747797**	2747797	**2747797**
N-sgb75.17	**2747864**	**2747864**	**2747864**	2747864.0	**2747864**	2747864	**2747864**
N-sgb75.18	**2579344**	**2579344**	**2579344**	2579344.0	**2579344**	2579344	**2579344**
N-sgb75.19	**2736221**	**2736221**	**2736221**	2736221.0	**2736221**	2736221	**2736221**
N-sgb75.20	**2732021**	**2732021**	**2732021**	2732021.0	**2732021**	2732021	**2732021**
N-sgb75.21	**2740289**	**2740289**	**2740289**	2740289.0	**2740289**	2740289	**2740289**
N-sgb75.22	**2710122**	**2710122**	**2710122**	2710122.0	**2710122**	2710122	**2710122**
N-sgb75.23	**2720981**	**2720981**	**2720981**	2720981.0	**2720981**	2720981	**2720981**
N-sgb75.24	**2743879**	**2743879**	**2743879**	2743879.0	**2743879**	2743879	**2743879**
N-sgb75.25	**2731542**	**2731542**	**2731542**	2731542.0	**2731542**	2731542	**2731542**

Table 4: Experimental result with SGB package

	RandB(1/2)						
Instance	ILSr	MAr	CD-RVNS	MA-EDM			Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-p40-01	**29457**	**29457**	**29457**	29457.0	**29457**	29457	**29457**
N-p40-02	**27482**	**27482**	**27482**	27482.0	**27482**	27482	**27482**
N-p40-03	**28061**	**28061**	**28061**	28061.0	**28061**	28061	**28061**
N-p40-04	**28740**	**28740**	**28740**	28740.0	**28740**	28740	**28740**
N-p40-05	**27450**	**27450**	**27450**	27450.0	**27450**	27450	**27450**
N-p40-06	**29164**	**29164**	**29164**	29164.0	**29164**	29164	**29164**
N-p40-07	**28379**	**28379**	**28379**	28379.0	**28379**	28379	**28379**
N-p40-08	**28267**	**28267**	**28267**	28267.0	**28267**	28267	**28267**
N-p40-09	**30578**	**30578**	**30578**	30578.0	**30578**	30578	**30578**
N-p40-10	**31737**	**31737**	**31737**	31737.0	**31737**	31737	**31737**
N-p40-11	**30658**	**30658**	**30658**	30658.0	**30658**	30658	**30658**
N-p40-12	**30986**	**30986**	**30986**	30986.0	**30986**	30986	**30986**
N-p40-13	**33903**	**33903**	**33903**	33903.0	**33903**	33903	**33903**
N-p40-14	**34078**	**34078**	**34078**	34078.0	**34078**	34078	**34078**
N-p40-15	**34659**	**34659**	**34659**	34659.0	**34659**	34659	**34659**
N-p40-16	**36044**	**36044**	**36044**	36044.0	**36044**	36044	**36044**
N-p40-17	**38201**	**38201**	**38201**	38201.0	**38201**	38201	**38201**
N-p40-18	**37562**	**37562**	**37562**	37562.0	**37562**	37562	**37562**
N-p40-19	**38956**	**38956**	**38956**	38956.0	**38956**	38956	**38956**
N-p40-20	**39658**	**39658**	**39658**	39658.0	**39658**	39658	**39658**
N-p44-01	**35948**	**35948**	**35948**	35948.0	**35948**	35948	**35948**
N-p44-02	**35314**	**35314**	**35314**	35314.0	**35314**	35314	**35314**
N-p44-03	**34335**	**34335**	**34335**	34335.0	**34335**	34335	**34335**
N-p44-04	**33551**	**33551**	**33551**	33551.0	**33551**	33551	**33551**
N-p44-05	**34827**	**34827**	**34827**	34827.0	**34827**	34827	**34827**
N-p44-06	**33962**	**33962**	**33962**	33962.0	**33962**	33962	**33962**
N-p44-07	**33171**	**33171**	**33171**	33171.0	**33171**	33171	**33171**
N-p44-08	**34127**	**34127**	**34127**	34127.0	**34127**	34127	**34127**
N-p44-09	**33403**	**33403**	**33403**	33403.0	**33403**	33403	**33403**
N-p44-10	**33778**	**33778**	**33778**	33778.0	**33778**	33778	**33778**
N-p44-11	**34016**	**34016**	**34016**	34016.0	**34016**	34016	34016
N-p44-12	**33850**	**33850**	**33850**	33850.0	**33850**	33850	**33850**
N-p44-13	**35385**	**35385**	**35385**	35385.0	**35385**	35385	**35385**
N-p44-14	**35801**	**35801**	**35801**	35801.0	**35801**	35801	**35801**
N-p44-15	**33827**	**33827**	**33827**	33827.0	**33827**	33827	**33827**
N-p44-16	**36188**	**36188**	**36188**	36188.0	**36188**	36188	**36188**
N-p44-17	**35454**	**35454**	**35454**	35454.0	**35454**	35454	**35454**
N-p44-18	**36669**	**36669**	**36669**	36669.0	**36669**	36669	**36669**
N-p44-19	**36436**	**36436**	**36436**	36436.0	**36436**	36436	**36436**
N-p44-20	**37438**	**37438**	**37438**	37438.0	**37438**	37438	**37438**
N-p44-21	**37786**	**37786**	**37786**	37786.0	**37786**	37786	**37786**
N-p44-22	**36722**	**36722**	**36722**	36722.0	**36722**	36722	**36722**
N-p44-23	**36605**	**36605**	**36605**	36605.0	**36605**	36605	**36605**
N-p44-24	**38286**	**38286**	**38286**	38286.0	**38286**	38286	**38286**
N-p44-25	**38129**	**38129**	**38129**	38129.0	**38129**	38129	**38129**

Table 5: Experimental result with RandB package (1/2)

	RandB(2/2)						
Instance	ILSr	MAr	CD-RVNS	MA-EDM			Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-p44-26	**39107**	**39107**	**39107**	39107.0	**39107**	39107	**39107**
N-p44-27	**39170**	**39170**	**39170**	39170.0	**39170**	39170	**39170**
N-p44-28	**40264**	**40264**	**40264.0**	40264.0	**40264**	40264	**40264**
N-p44-29	**41819**	**41819**	**41819.0**	41819.0	**41819**	41819	**41819**
N-p44-30	**40387**	**40387**	**40387.0**	40387.0	**40387**	40387	**40387**
N-p44-31	**43817**	**43817**	**43817.0**	43817.0	**43817**	43817	**43817**
N-p44-32	**42545**	**42545**	**42545.0**	42545.0	**42545**	42545	**42545**
N-p44-33	**42355**	**42355**	**42355.0**	42355.0	**42355**	42355	**42355**
N-p44-34	**44988**	**44988**	**44988.0**	44988.0	**44988**	44988	**44988**
N-p44-35	**44114**	**44114**	**44114.0**	44114.0	**44114**	44114	**44114**
N-p44-36	**45575**	**45575**	**45575.0**	45575.0	**45575**	45575	**45575**
N-p44-37	**45297**	**45297**	**45297.0**	45297.0	**45297**	45297	**45297**
N-p44-38	**47414**	**47414**	**47414.0**	47414.0	**47414**	47414	**47414**
N-p44-39	**48979**	**48979**	**48979.0**	48979.0	**48979**	48979	**48979**
N-p44-40	**47774**	**47774**	**47774.0**	47774.0	**47774**	47774	**47774**
N-p44-41	**48137**	**48137**	**48137.0**	48137.0	**48137**	48137	**48137**
N-p44-42	**49511**	**49511**	**49511.0**	49511.0	**49511**	49511	**49511**
N-p44-43	**51014**	**51014**	**51014.0**	51014.0	**51014**	51014	**51014**
N-p44-44	**51949**	**51949**	**51949.0**	51949.0	**51949**	51949	**51949**
N-p44-45	**52857**	**52857**	**52857.0**	52857.0	**52857**	52857	**52857**
N-p44-46	**52776**	**52776**	**52776.0**	52776.0	**52776**	52776	**52776**
N-p44-47	**54122**	**54122**	**54122.0**	54122.0	**54122**	54122	**54122**
N-p44-48	**54355**	**54355**	**54355.0**	54355.0	**54355**	54355	**54355**
N-p44-49	**57279**	**57279**	**57279.0**	57279.0	**57279**	57279	**57279**
N-p44-50	**56444**	**56444**	**56444.0**	56444.0	**56444**	56444	**56444**
N-p50-01	**44667**	**44667**	**44667.0**	44667.0	**44667**	44667	**44667**
N-p50-02	**43835**	**43835**	**43835.0**	43835.0	**43835**	43835	**43835**
N-p50-03	**44256**	**44256**	**44256.0**	44256.0	**44256**	44256	**44256**
N-p50-04	**43928**	**43928**	**43928.0**	43928.0	**43928**	43928	**43928**
N-p50-05	**42907**	**42907**	**42907.0**	42907.0	**42907**	42907	**42907**
N-p50-06	**42325**	**42325**	**42325.0**	42325.0	**42325**	42325	**42325**
N-p50-07	**42640**	**42640**	**42640.0**	42640.0	**42640**	42640	**42640**
N-p50-08	**42666**	**42666**	**42666.0**	42666.0	**42666**	42666	**42666**
N-p50-09	**43711**	**43711**	**43711.0**	43711.0	**43711**	43711	**43711**
N-p50-10	**43575**	**43575**	**43575.0**	43575.0	**43575**	43575	**43575**
N-p50-11	**43527**	**43527**	**43527.0**	43527.0	**43527**	43527	**43527**
N-p50-12	**42809**	**42809**	**42809.0**	42809.0	**42809**	42809	**42809**
N-p50-13	**43169**	**43169**	**43169.0**	43169.0	**43169**	43169	**43169**
N-p50-14	**44519**	**44519**	**44519.0**	44519.0	**44519**	44519	**44519**
N-p50-15	**44866**	**44866**	**44866.0**	44866.0	**44866**	44866	**44866**
N-p50-16	**45310**	**45310**	**45310.0**	45310.0	**45310**	45310	**45310**
N-p50-17	**46011**	**46011**	**46011.0**	46011.0	**46011**	46011	**46011**
N-p50-18	**46897**	**46897**	**46897.0**	46897.0	**46897**	46897	**46897**
N-p50-19	**47212**	**47212**	**47212.0**	47212.0	**47212**	47212	**47212**
N-p50-20	**46779**	**46779**	**46779.0**	46779.0	**46779**	46779	**46779**

Table 6: Experimental result with RandB package (2/2)

				Spec			
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-atp111	**1495**	**1495**	**1495**	1495.0	**1495**	1495	**1495**
N-atp134	**1797***	**1797***	1796	1797.0	**1797***	1797	1796
N-atp163	**2075***	**2075***	**2075***	2075.0	**2075***	2075	2073
N-atp24	**172**	**172**	**172**	172.0	**172**	172	**172**
N-atp452	**2713***	**2713***	2708	2709.3	**2713***	2707	2710
N-atp48	**483**	**483**	**483**	483.0	**483**	483	**483**
N-atp66	**761**	**761**	**761**	761.0	**761**	761	**761**
N-atp76	**934**	**934**	**934**	934.0	**934**	934	**934**
N-econ36	**548574**	**548574**	**548574**	548574.0	**548574**	548574	**548574**
N-econ43	**667369**	**667369**	**667369**	667369.0	**667369**	667369	**667369**
N-econ47	**828816**	**828816**	**828816**	828816.0	**828816**	828816	**828816**
N-econ58	**1221888**	**1221888**	**1221888**	1221888.0	**1221888**	1221888	**1221888**
N-econ59	**1209683**	**1209683**	**1209683**	1209683.0	**1209683**	1209683	**1209683**
N-econ61	**1218023**	**1218023**	**1218023**	1218023.0	**1218023**	1218023	**1218023**
N-econ62	**1235677**	**1235677**	**1235677**	1235677.0	**1235677**	1235677	**1235677**
N-econ64	**1272461**	**1272461**	**1272461**	1272461.0	**1272461**	1272461	**1272461**
N-econ67	**1388317**	**1388317**	**1388317**	1388317.0	**1388317**	1388317	**1388317**
N-econ68	**1438378**	**1438378**	**1438378**	1438378.0	**1438378**	1438378	**1438378**
N-econ71	**1558292**	**1558292**	**1558292**	1558292.0	**1558292**	1558292	**1558292**
N-econ72	**1835631**	**1835631**	**1835631**	1835631.0	**1835631**	1835631	**1835631**
N-econ73	**2046112**	**2046112**	**2046112**	2046112.0	**2046112**	2046112	**2046112**
N-econ76	**2649134**	**2649134**	**2649134**	2649134.0	**2649134**	2649134	**2649134**
N-econ77	**2674732**	**2674732**	**2674732**	2674732.0	**2674732**	2674732	**2674732**
N-EX1	**449**	**449**	**449**	449.0	**449**	449	**449**
N-EX2	**441**	**441**	**441**	441.0	**441**	441	**441**
N-EX3	**438**	**438**	**438**	438.0	**438**	438	**438**
N-EX4	**390**	**390**	**390**	390.0	**390**	390	**390**
N-EX5	**405**	**405**	**405**	405.0	**405**	405	**405**
N-EX6	**395**	**395**	**395**	395.0	**395**	395	**395**
N-pal11	**35**	**35**	**35**	35.0	**35**	35	**35**
N-pal13	**57**	**57**	**57**	57.0	**57**	57	**57**
N-pal19	**107**	**107**	**107**	107.0	**107**	107	**107**
N-pal23	**161**	**161**	**161**	161.0	**161**	161	**161**
N-pal27	**252**	**252**	**252**	252.0	**252**	252	**252**
N-pal31	**285**	**285**	**285**	285.0	**285**	285	**285**
N-pal43	**543**	**543**	**543**	543.0	**543**	543	**543**
N-pal55	**1045**	**1045**	**1045**	1045.0	**1045**	1045	**1045**

Table 7: Experimental result with Spec package

	RandA1(1/2)						
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-t1d100.01	**106852**	**106852**	**106852**	106852.0	**106852**	106852	**106852**
N-t1d100.02	105916	**105947**	**105947**	105947.0	**105947**	105947	**105947**
N-t1d100.03	**109819**	**109819**	**109819**	109819.0	**109819**	109819	**109819**
N-t1d100.04	**109252**	**109252**	**109252**	109252.0	**109252**	109252	**109252**
N-t1d100.05	**108859**	**108859**	**108859**	108859.0	**108859**	108859	**108859**
N-t1d100.06	**108201**	**108201**	**108201**	108201.0	**108201**	108201	**108201**
N-t1d100.07	**108803**	**108803**	**108803**	108803.0	**108803**	108803	**108803**
N-t1d100.08	**107480**	**107480**	**107480**	107480.0	**107480**	107480	**107480**
N-t1d100.09	**108549**	**108549**	**108549**	108549.0	**108549**	108549	**108549**
N-t1d100.10	**108771**	**108771**	**108771**	108771.0	**108771**	108771	**108771**
N-t1d100.11	**107920**	**107920**	**107920**	107920.0	**107920**	107920	**107920**
N-t1d100.12	**108389**	**108389**	**108389**	108389.0	**108389**	108389	**108389**
N-t1d100.13	**108702**	**108702**	**108702**	108702.0	**108702**	108702	**108702**
N-t1d100.14	**105583**	**105583**	**105583**	105583.0	**105583**	105583	**105583**
N-t1d100.15	**108667**	**108667**	**108667**	108667.0	**108667**	108667	**108667**
N-t1d100.16	**107426**	**107426**	**107426**	107426.0	**107426**	107426	**107426**
N-t1d100.17	**105612**	**105612**	**105612**	105612.0	**105612**	105612	**105612**
N-t1d100.18	**107861**	**107861**	**107861**	107861.0	**107861**	107861	**107861**
N-t1d100.19	**108026**	**108026**	**108026**	108026.0	**108026**	108026	**108026**
N-t1d100.20	**109968**	**109968**	**109968**	109968.0	**109968**	109968	**109968**
N-t1d100.21	**107255**	**107255**	**107255**	107255.0	**107255**	107255	**107255**
N-t1d100.22	**108250**	**108250**	**108250**	108250.0	**108250**	108250	**108250**
N-t1d100.23	**106146**	**106146**	**106146**	106146.0	**106146**	106146	**106146**
N-t1d100.24	**108782**	**108782**	**108782**	108782.0	**108782**	108782	**108782**
N-t1d100.25	**106933**	**106933**	**106933**	106933.0	**106933**	106933	**106933**
N-t1d150.01	**235056**	**235056**	**235056**	235056.0	**235056**	235056	**235056**
N-t1d150.02	**234421**	**234421**	**234421**	234421.0	**234421**	234421	**234421**
N-t1d150.03	**236319**	**236319**	**236319**	236319.0	**236319**	236319	**236319**
N-t1d150.04	234506	**234510**	**234510**	234510.0	**234510**	234510	**234510**
N-t1d150.05	234571	**234601**	**234601**	234601.0	**234601**	234601	**234601**
N-t1d150.06	**234465**	**234465**	**234465**	234465.0	**234465**	234465	**234465**
N-t1d150.07	**235282**	**235283**	**235283**	235283.0	**235283**	235283	**235283**
N-t1d150.08	**237230**	**237230**	**237230**	237230.0	**237230**	237230	**237230**
N-t1d150.09	**237253**	**237253**	237245	237253.0	**237253**	237253	**237253**
N-t1d150.10	**234821**	**234821**	**234821**	234821.0	**234821**	234821	**234821**
N-t1d150.11	**234157**	**234157**	**234157**	234157.0	**234157**	234157	**234157**
N-t1d150.12	**236318**	**236318**	**236318**	236318.0	**236318**	236318	**236318**
N-t1d150.13	**237116**	**237116**	**237116**	237116.0	**237116**	237116	**237116**
N-t1d150.14	**234453**	**234453**	**234453**	234453.0	**234453**	234453	**234453**
N-t1d150.15	232058	**232065**	232045	232065.0	**232065**	232065	**232065**
N-t1d150.16	**232948**	**232948**	**232948**	232948.0	**232948**	232948	**232948**
N-t1d150.17	**236656**	**236656**	**236656**	236656.0	**236656**	236656	**236656**
N-t1d150.18	**234348**	**234348**	234305	234348.0	**234348**	234348	**234348**
N-t1d150.19	**234994**	**234994**	**234994**	234994.0	**234994**	234994	**234994**
N-t1d150.20	235385	**235411**	**235411**	235411.0	**235411**	235411	**235411**
N-t1d150.21	**233988***	**233988***	**233988***	233988.0	**233988***	233988	233980
N-t1d150.22	235372	**235415**	**235415**	235415.0	**235415**	235415	**235415**
N-t1d150.23	**233492**	**233492**	**233492**	233492.0	**233492**	233492	**233492**
N-t1d150.24	**236016**	**236016**	**236016**	236016.0	**236016**	236016	**236016**
N-t1d150.25	**236428**	**236428**	**236428**	236428.0	**236428**	236428	**236428**
N-t1d200.01	**410992***	**410992***	**410992***	410992.0	**410992***	410992	410871

Table 8: Experimental result with RandA1 package (1/2)

				RandA1(2/2)				
Instance	ILSr	MAr	CD-RVNS		MA-EDM			Best Knowns
	Best	Best	Best	Mean	Best	Worst		
N-t1d200.02	407733	407733	407733	407735.0	**407735***	407735		407729
N-t1d200.03	**407420**	**407420**	407417	407419.9	**407420**	407417		**407420**
N-t1d200.04	409988	**410120***	410067	410120.0	**410120***	410120		410101
N-t1d200.05	411398	**411522**	411481	411521.4	**411522**	411516		**411522**
N-t1d200.06	**406451**	**406451**	**406451**	406451.0	**406451**	406451		**406451**
N-t1d200.07	**412242**	**412482**	**412482**	412482.0	**412482**	412482		**412482**
N-t1d200.08	408844	**408952***	408902	408952.0	**408952***	408952		408850
N-t1d200.09	**409308**	**409308**	**409308**	409308.0	**409308**	409308		**409308**
N-t1d200.10	406407	**406457***	406439	406451.5	**406457***	406439		406453
N-t1d200.11	410181	**410239**	**410239**	410239.0	**410239**	410239		**410239**
N-t1d200.12	412818	412831	412831	412838.0	**412838***	412838		412831
N-t1d200.13	409000	**409270***	**409270***	409270.0	**409270***	409270		409234
N-t1d200.14	408865	**408879**	408865	408879.0	**408879**	408879		**408879**
N-t1d200.15	409059	**409073***	409049	409073.0	**409073***	409073		409061
N-t1d200.16	408054	**408059**	**408059**	408059.0	**408059**	408059		**408059**
N-t1d200.17	**410280**	**410280**	**410280**	410280.0	**410280**	410280		**410280**
N-t1d200.18	407730	**407822***	407735	407822.0	**407822***	407822		407709
N-t1d200.19	412876	**412947**	**412947**	412947.0	**412947**	412947		**412947**
N-t1d200.20	406418	406420	406418	406425.0	**406425***	406425		406418
N-t1d200.21	408034	**408037**	**408037**	408037.0	**408037**	408037		**408037**
N-t1d200.22	407333	**407459***	**407459***	407455.0	**407459***	407339		407333
N-t1d200.23	408550	**408552**	408542	408552.0	**408552**	408552		**408552**
N-t1d200.24	410576	**410583**	410547	410582.8	**410583**	410576		**410583**
N-t1d200.25	406467	**406478 ***	406476	406478.0	**406478***	406478		406356
N-t1d500.1	2420621	2423064	2422232	2410577.1	**2423457***	2403190		2402357
N-t1d500.10	2405717	2407330	2405802	2407148.5	**2407443***	2406883		2404420
N-t1d500.11	2415955	2418530	2416807	2418476.1	**2418845***	2417749		2416286
N-t1d500.12	2401800	2403350	2403110	2403572.2	**2403988***	2403190		2402581
N-t1d500.13	2403550	2407315	2405528	2406907.9	**2407348***	2406344		2405118
N-t1d500.14	2408886	2411486	2409864	2411351.1	**2411584***	2411056		2410693
N-t1d500.15	2411460	2413857	2412944	2413599.3	**2413942***	2413113		2411718
N-t1d500.16	2415327	2417733	2416699	2417744.6	**2418236***	2416905		2416067
N-t1d500.17	2401254	2404243	2402214	2403854.4	**2404510***	2403275		2401800
N-t1d500.18	2420621	2423064	2422232	2423073.9	**2423457***	2422444		2421159
N-t1d500.19	2402596	2405384	2404686	2405247.0	**2405574***	2405036		2404029
N-t1d500.2	2412885	2416037	2414921	2409774.4	**2416247***	2404066		2411570
N-t1d500.20	2412885	2416037	2414921	2416035.1	**2416247***	2415557		2414713
N-t1d500.21	2405348	2407467	2406234	2407399.8	**2407797***	2407165		2405615
N-t1d500.22	2407797	2410264	2408238	2410296.8	**2410562***	2410054		2408164
N-t1d500.23	2407507	2409944	2408703	2409867.3	**2410106***	2409379		2408689
N-t1d500.24	2402201	2404576	2403394	2404446.6	**2404715***	2404066		2402712
N-t1d500.25	2404316	2406897	2406314	2407037.9	**2407443***	2406667		2405718
N-t1d500.3	2404614	2406541	2405103	2406420.0	**2406736***	2405893		2404784
N-t1d500.4	2412715	2415948	2415141	2415795.7	**2416394***	2415117		2413600
N-t1d500.5	2391129	2393353	2392286	2393046.9	**2393369***	2392585		2391486
N-t1d500.6	2397808	2402017	2400672	2401737.8	**2402033***	2401277		2399394
N-t1d500.7	2398619	2401846	2400028	2401663.3	**2402100***	2401090		2400739
N-t1d500.8	2413674	2415149	2414089	2415255.5	**2415545***	2414982		2413108
N-t1d500.9	2405670	2408454	2407017	2408378.5	**2408649***	2407814		2406223

Table 9: Experimental result with RandA1 package (2/2)

				RandA2(1/2)			
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-t2d100.01	**25362**	**25362**	**25362**	25362	**25362**	25362	**25362**
N-t2d100.02	**28326**	**28326**	**28326**	28326	**28326**	28326	**28326**
N-t2d100.03	**25886**	**25886**	**25886**	25886	**25886**	25886	**25886**
N-t2d100.04	**26076**	**26076**	**26076**	26076	**26076**	26076	**26076**
N-t2d100.05	**25118**	**25118**	**25118**	25118	**25118**	25118	**25118**
N-t2d100.06	**25380**	**25380**	**25380**	25380	**25380**	25380	**25380**
N-t2d100.07	**27144**	**27144**	**27144**	27144	**27144**	27144	**27144**
N-t2d100.08	**23784**	**23784**	**23784**	23784	**23784**	23784	**23784**
N-t2d100.09	**27752**	**27752**	**27752**	27752	**27752**	27752	**27752**
N-t2d100.10	**26690**	**26690**	**26690**	26690	**26690**	26690	**26690**
N-t2d100.11	**25106**	**25106**	**25106**	25106	**25106**	25106	**25106**
N-t2d100.12	**26782**	**26782**	**26782**	26782	**26782**	26782	**26782**
N-t2d100.13	**27878**	**27878**	**27878**	27878	**27878**	27878	**27878**
N-t2d100.14	**25878**	**25878**	**25878**	25878	**25878**	25878	**25878**
N-t2d100.15	**24232**	**24232**	**24232**	24232	**24232**	24232	**24232**
N-t2d100.16	**28206**	**28206**	**28206**	28206	**28206**	28206	**28206**
N-t2d100.17	**26704**	**26704**	**26704**	26704	**26704**	26704	**26704**
N-t2d100.18	**26928**	**26928**	**26928**	26928	**26928**	26928	**26928**
N-t2d100.19	**28760**	**28760**	**28760**	28760	**28760**	28760	**28760**
N-t2d100.20	**25220**	**25220**	**25220**	25220	**25220**	25220	**25220**
N-t2d100.21	**24452**	**24452**	**24452**	24452	**24452**	24452	**24452**
N-t2d100.22	**27230**	**27230**	**27230**	27230	**27230**	27230	**27230**
N-t2d100.23	**25588**	**25588**	**25588**	25588	**25588**	25588	**25588**
N-t2d100.24	**24800**	**24800**	**24800**	24800	**24800**	24800	**24800**
N-t2d100.25	**23742**	**23742**	**23742**	23742	**23742**	23742	**23742**
N-t2d150.01	**76041**	**76041**	**76041**	76041	**76041**	76041	**76041**
N-t2d150.02	**73624**	**73624**	**73624**	73624	**73624**	73624	**73624**
N-t2d150.03	**69705**	**69705**	**69705**	69705	**69705**	69705	**69705**
N-t2d150.04	**73963**	**73963**	**73963**	73963	**73963**	73963	**73963**
N-t2d150.05	**79723**	**79723**	**79723**	79723	**79723**	79723	**79723**
N-t2d150.06	**75440**	**75440**	**75440**	75440	**75440**	75440	**75440**
N-t2d150.07	**73858**	**73858**	**73858**	73858	**73858**	73858	**73858**
N-t2d150.08	**67463**	**67463**	**67463**	67463	**67463**	67463	**67463**
N-t2d150.09	**70739**	**70739**	**70739**	70739	**70739**	70739	**70739**
N-t2d150.10	**69029**	**69029**	**69029**	69029	**69029**	69029	**69029**
N-t2d150.11	**72800**	**72800**	**72800**	72800	**72800**	72800	**72800**
N-t2d150.12	**72181**	**72181**	**72181**	72181	**72181**	72181	**72181**
N-t2d150.13	**74580**	**74580**	**74580**	74580	**74580**	74580	**74580**
N-t2d150.14	**68132**	**68132**	**68132**	68132	**68132**	68132	**68132**
N-t2d150.15	**76831**	**76831**	**76831**	76831	**76831**	76831	**76831**
N-t2d150.16	**72018**	**72018**	**72018**	72018	**72018**	72018	**72018**
N-t2d150.17	**70185**	**70185**	**70185**	70185	**70185**	70185	**70185**
N-t2d150.18	**73191**	**73191**	**73191**	73191	**73191**	73191	**73191**
N-t2d150.19	**75958**	**75958**	**75958**	75958	**75958**	75958	**75958**
N-t2d150.20	**67370**	**67370**	**67370**	67370	**67370**	67370	**67370**
N-t2d150.21	**70297**	**70297**	**70297**	70297	**70297**	70297	**70297**
N-t2d150.22	**69287**	**69287**	**69287**	69287	**69287**	69287	**69287**
N-t2d150.23	**74799**	**74799**	**74799**	74799	**74799**	74799	**74799**
N-t2d150.24	**70063**	**70063**	**70063**	70063	**70063**	70063	**70063**

Table 10: Experimental result with RandA2 package (1/2)

RandA2(2/2)						
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-t2d150.25	**73853**	**73853**	**73853**	73853	**73853**	73853	**73853**
N-t2d200.01	147740	**147742***	**147742***	147742	**147742***	147742	147740
N-t2d200.02	**144218**	**144218**	**144218**	144218	**144218**	144218	**144218**
N-t2d200.03	**141378**	**141378**	**141378**	141378	**141378**	141378	**141378**
N-t2d200.04	150874	**150878***	**150878***	150878	**150878***	150878	150870
N-t2d200.05	**150236**	**150236**	**150236**	150236	**150236**	150236	**150236**
N-t2d200.06	**141254**	**141254**	**141254**	141254	**141254**	141254	**141254**
N-t2d200.07	**149752**	**149752**	**149752**	149752	**149752**	149752	**149752**
N-t2d200.08	**149910**	**149910**	**149910**	149910	**149910**	149910	**149910**
N-t2d200.09	141956	**141958**	**141958**	141958	**141958**	141958	**141958**
N-t2d200.10	149628	**149630***	149628	149630	**149630***	149630	149628
N-t2d200.11	**147542***	**147542***	**147542***	147542	**147542***	147542	147540
N-t2d200.12	**152470**	**152470**	**152470**	152470	**152470**	152470	**152470**
N-t2d200.13	137614	**137618**	**137618**	137618	**137618**	137618	**137618**
N-t2d200.14	144382	**144384**	**144384**	144384	**144384**	144384	**144384**
N-t2d200.15	**140442**	**140442**	**140442**	140442	**140442**	140442	**140442**
N-t2d200.16	147446	**147448**	**147448**	147448	**147448**	147448	**147448**
N-t2d200.17	**131874**	**131874**	**131874**	131874	**131874**	131874	**131874**
N-t2d200.18	**151196**	**151196**	**151196**	151196	**151196**	151196	**151196**
N-t2d200.19	**137314**	**137314**	**137314**	137314	**137314**	137314	**137314**
N-t2d200.20	**146508**	**146508**	**146508**	146508	**146508**	146508	**146508**
N-t2d200.21	143562	**143568**	**143568**	143568	**143568**	143568	**143568**
N-t2d200.22	**146920**	**146920**	**146920**	146920	**146920**	146920	**146920**
N-t2d200.23	**145034**	**145034**	**145034**	145034	**145034**	145034	**145034**
N-t2d200.24	151258	**151260**	**151260**	151260	**151260**	151260	**151260**
N-t2d200.25	**149128**	**149128**	**149128**	149128	**149128**	149128	**149128**

Table 11: Experimental result with RandA2 package (2/2)

xLOLIB (1/3)

Instance	ILSr Best	MAr Best	CD-RVNS Best	CD-RVNS Mean	MA-EDM Best	MA-EDM Worst	Best Knowns
N-be75eec_150	3482801	**3482828**	3480977	3482828.0	**3482828**	3482828	**3482828**
N-be75eec_250	8897352	8894356	8896252	8902490.7	8903348*	8901591	8900531
N-be75np_150	7174993	7176535	7173646	7182660.0	**7182660**	7182660	**7182660**
N-be75np_250	17823806	17823574	17819152	17829273.0	17833911*	17823816	17822571
N-be75oi_150	2246217	**2246853**	**2246853**	2246853.0	**2246853**	2246853	**2246853**
N-be75oi_250	5911278	5912761*	5912632	5912761.0	5912761*	5912761	5912445
N-be75tot_150	12288727	12288855*	12288749	12288855.0	12288855*	12288855	12288727
N-be75tot_250	30993884	31003354	30976006	31007026.5	31007081*	31005447	30998382
N-stabu1_150	**2875732**	**2875732**	2873715	2875732.0	**2875732**	2875732	**2875732**
N-stabu1_250	7746680	7747611	7741250	7748319.4	7748569*	7747642	7747599
N-stabu2_150	4328513	4328514*	4327960	4328514.0	4328514*	4328514	4327870
N-stabu2_250	11508886	11512427	11501141	11520381.2	11520387*	11520380	11516097
N-stabu3_150	4510414	**4510445**	**4510445**	4510445.0	**4510445**	4510445	**4510445**
N-stabu3_250	11906428	11909920	11903836	11913660.0	11914130*	11909417	11909920
N-t59b11xx_150	3239395	**3239550**	3239495	3239550.0	**3239550**	3239550	**3239550**
N-t59b11xx_250	8417060	8419535*	8411100	8419525.8	8419535*	8419480	8411760
N-t59d11xx_150	1462606	1462697*	1462490	1462697.0	1462697*	1462697	1462418
N-t59d11xx_250	3843273	3843566	3842549	3844637.0	3844651*	3844511	3843003
N-t59f11xx_150	1543224	**1543733**	1542952	1543733.0	**1543733**	1543733	**1543733**
N-t59f11xx_250	3992830	3995886*	3993566	3995886.0	3995886*	3995886	3995868
N-t59n11xx_150	318998	319001*	319001*	319001.0	319001*	319001	318951
N-t59n11xx_250	825127	825676	824913	825773.8	825827*	825637	825023
N-t65b11xx_150	6454355	6454818	**6455861**	6455861.0	**6455861**	6455861	**6455861**
N-t65b11xx_250	17268711	17276667*	17272709	17276667.0	17276667*	17276667	17275227
N-t65d11xx_150	3559347	3559437*	3559347	3559437.0	3559437*	3559437	3559347
N-t65d11xx_250	9353295	9357339	9352659	9359469.0	9359469*	9359469	9353593
N-t65f11xx_150	3159573	3159655	3160165*	3160165.0	3160165*	3160165	3159326
N-t65f11xx_250	8414986	8416795	8414292	8420489.2	8421279*	8419386	8417742
N-t65l11xx_150	253411	**253417**	253283	253417.0	**253417**	253417	**253417**
N-t65l11xx_250	666896	666580	666605	667334.7	667403*	667233	666915
N-t65n11xx_150	550856	**550893**	550579	550893.0	**550893**	550893	**550893**

Table 12: Experimental result with xLOLIB package (1/3)

xLOLIB (2/3)

Instance	ILSr Best	MAr Best	CD-RVNS Best	MA-EDM Mean	MA-EDM Best	Worst	Best Knowns
N-t65n11xx_250	1431353	1431578	1430961	1432130.0	**1432130***	1432130	1430863
N-t69r11xx_150	11857804	11855957	**11858249**	11858249.0	**11858249**	11858249	11858249
N-t69r11xx_250	31831109	**31839590***	31769801	31839590.0	**31839590***	31839590	31822418
N-t70b11xx_150	9644574	**9649316***	**9649316***	9649316.0	**9649316***	9649316	9645830
N-t70b11xx_250	25409706	**25416607**	25407713	25416607.0	**25416607**	25416607	**25416607**
N-t70d11xn_150	5825590	5825719	5822429	5825947.0	**5825947**	5825947	**5825947**
N-t70d11xn_250	15207756	15216164	15198002	15216669.1	**15216680***	15216354	15211056
N-t70d11xx_150	6174117	**6174178**	**6174178**	6174178.0	**6174178**	6174178	**6174178**
N-t70d11xx_250	16048192	**16051624***	16041208	16051624.0	**16051624***	16051624	16043251
N-t70f11xx_150	5150097	**5150097**	5150097	5150097.0	**5150097**	5150097	**5150097**
N-t70f11xx_250	13589879	13597149	13586212	13602640.8	**13602981***	13598786	13598786
N-t70l11xx_150	436853	436863	**436882**	436882.0	**436882**	436882	**436882**
N-t70l11xx_250	1114063	1114488	1114150	1114689.0	**1114689***	1114689	1114166
N-t70m11xx_150	948900	**948913**	948896	948913.0	**948913**	948913	**948913**
N-t70m11xx_250	2445246	2446502	2443540	2447000.2	**2447203***	2446330	2445125
N-t74d11xx_150	9395864	**9396044**	9394710	9396044.0	**9396044**	9396044	**9396044**
N-t74d11xx_250	24443800	24447256	24438349	24450865.7	**24451465***	24450269	24445112
N-t75d11xx_150	9645000	**9645000***	9639371	9645000.0	**9645000***	9645000	9642140
N-t75d11xx_250	25036633	25052186	25042929	25055635.1	**25056847***	25053274	25048727
N-t75e11xx_150	41569005	**41571407**	**41571407**	41571407.0	**41571407**	41571407	**41571407**
N-t75e11xx_250	106898101	106920648	106860905	106921191.5	**106923099***	106920648	106912899
N-t75k11xx_150	1541574	**1541596**	**1541596**	1541596.0	**1541596**	1541596	**1541596**
N-t75k11xx_250	4095112	4096192	4092410	4096793.0	**4098580***	4096192	4094732
N-t75n11xx_150	1743083	**1743094**	1741831	1743094.0	**1743094**	1743094	**1743094**
N-t75n11xx_250	4527802	4529018	4523448	4529853.0	**4529853**	4529853	**4529853**
N-tiw56n54_150	837941	**837945**	**837945**	837945.0	**837945**	837945	**837945**
N-tiw56n54_250	2099884	2099740	2097780	2100665.0	**2100929***	2100245	2099727
N-tiw56n58_150	1155384	**1155392**	**1155392**	1155392.0	**1155392**	1155392	**1155392**
N-tiw56n58_250	2906394	**2907509***	2903550	2907442.0	**2907509***	2907218	2906751

Table 13: Experimental result with xLOLIB package (2/3)

xLOLIB (3/3)

Instance	ILSr	MAr	CD-RVNS	MA-EDM			Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-tiw56n62_150	1627175	**1627400***	1626921	1627400.0	**1627400***	1627400	1626528
N-tiw56n62_250	4144366	4145046	4143770	4145731.0	**4145968***	4145133	4145747
N-tiw56n66_150	2107607	**2107619**	**2107619**	2107619.0	**2107619**	2107619	**2107619**
N-tiw56n66_250	5370621	5371757	5367156	5372792.2	**5373238***	5372378	5371157
N-tiw56n67_150	2372892	**2372945**	2372926	2372945.0	**2372945**	2372945	**2372945**
N-tiw56n67_250	6325349	**6326881**	6326461	6326849.9	**6326881**	6326415	**6326881**
N-tiw56n72_150	4135864	**4135952**	**4135952**	4135952.0	**4135952**	4135952	**4135952**
N-tiw56n72_250	11154261	11154588	11152941	11157360.6	**11157434***	11156871	11156640
N-tiw56r54_150	958274	**958277***	**958277***	958277.0	**958277***	958277	958060
N-tiw56r54_250	2388162	2388508	2388437	2389642.5	**2389735***	2389156	2388072
N-tiw56r58_150	**1219295**	**1219295**	1219043	1219295.0	**1219295**	1219295	**1219295**
N-tiw56r58_250	3060034	3060523	3061002	3061873.7	**3061948***	3061394	3060787
N-tiw56r66_150	1940728	**1940755**	**1940755**	1940755.0	**1940755**	1940755	**1940755**
N-tiw56r66_250	4948142	4949614	4947805	4950408.7	**4950654***	4950204	4948268
N-tiw56r67_150	2058021	2057730	2056745	2058095.0	**2058095***	2058095	2057237
N-tiw56r67_250	5292284	5293543	5290921	5293917.6	**5293925***	5293785	5293543
N-tiw56r72_150	2823758	2823758	**2824014***	2824014.0	**2824014***	2824014	2823758
N-tiw56r72_250	7452408	7454049	7457700	7458261.0	**7458261***	7458261	7457217

Table 14: Experimental result with xLOLIB package (3/3)

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xLOLIB2 (1/10)

Instance	ILSr	MAr	CD-RVNS		MA-EDM	Worst	Best Knowns
	Best	Best	Best	Mean	Best		
N-be75eec_1000	122559313	122829974	122446836	122852580.8	**122927794***	122747549	122183020
N-be75eec_300	12417321	12427692	12413618	12435484.4	**12437701***	12430693	12401915
N-be75eec_500	33396302	33421853	33376827	33454550.6	**33464804***	33442222	33335021
N-be75eec_750	71549643	71656978	71475604	71706969.0	**71724346***	71685477	71335951
N-be75np_1000	246911024	247605196	246808042	247717842.3	**247827883***	247610781	245965411
N-be75np_300	26102788	26121007	26103943	26126616.2	**26127625***	26125710	26058695
N-be75np_500	66861007	66936681	66796026	66954666.9	**66991918***	66918144	66706038
N-be75np_750	142604680	142912740	142495442	142960348.3	**143015205***	142916133	142235433
N-be75oi_1000	95238461	95497576	95270382	95533297.7	**95660368***	95210530	95107894
N-be75oi_300	9398390	9402938	9394172	9405553.0	**9407042***	9404684	9389582
N-be75oi_500	25369064	25400317	25356187	25416401.4	**25423876***	25409588	25344958
N-be75oi_750	57514793	57612199	57528761	57650504.9	**57667942***	57622546	57446206
N-be75tot_1000	421935738	422994922	421786261	423082071.7	**423334547***	422902654	420848949
N-be75tot_300	43772491	43788425	43784847	43822819.3	**43838792***	43804764	43728689
N-be75tot_500	114142084	114282182	113975456	114349941.0	**114378983***	114312964	113769897
N-be75tot_750	247257313	247773969	247154651	247869600.7	**248035898***	247763502	246647833
N-stabu70_1000	100970352	101220135	100844471	101250031.3	**101281394***	101167680	100678451
N-stabu70_300	9998137	9997159	9984345	10004745.6	**10007371***	9999127	9980631
N-stabu70_500	27279696	27293837	27253279	27310907.6	**27329658***	27295333	27206945
N-stabu70_750	58447453	58536741	58372134	58575871.1	**58591596***	58556879	58260994
N-stabu74_1000	151551303	151884961	151547644	151915503.5	**151995659***	151858596	151099343
N-stabu74_300	15036590	15035171	15022700	15040369.7	**15045552***	15038580	15007346
N-stabu74_500	41179954	41202108	41161043	41243725.4	**41255113***	41213355	41098723
N-stabu74_750	87802725	87970020	87658155	87993462.9	**88032483***	87961461	87467424
N-stabu75_1000	156818862	157314529	156887508	157409878.0	**157509324***	157340067	156432889
N-stabu75_300	15573204	15590606	15592232	15593175.4	**15594987***	15591886	15561023
N-stabu75_500	42732861	42754239	42659815	42796081.1	**42811288***	42776106	42671550
N-stabu75_750	90850756	90999962	90744546	91027049.9	**91056055***	90981042	90599301
N-t59b11xx_1000	102212770	102460630	102162215	102500204.0	**102552395***	102452815	101988220
N-t59b11xx_300	10407550	10410360	10391075	10417921.3	**10418775***	10414710	10400625
N-t59b11xx_500	27715530	27758360	27674730	27758145.2	**27765885***	27745290	27630465
N-t59b11xx_750	59999365	60094250	59956710	60115934.3	**60155665***	60062470	59760540

Table 15: Experimental result with xLOLIB2 package (1/10)

	xLOLIB2 (2/10)						
	ILSr	MAr	CD-RVNS		MA-EDM		Best
Instance	Best	Best	Best	Mean	Best	Worst	Knowns
N-t59d11xx_1000	50909272	51012543	50899170	51029512.1	**51047439***	50999626	50832719
N-t59d11xx_300	5035050	5034335	5027453	5037089.8	**5037176***	5036529	5025078
N-t59d11xx_500	13271368	13287421	13253280	13288988.9	**13294224***	13285317	13246941
N-t59d11xx_750	29889128	29937634	29867228	29948276.7	**29957553***	29938351	29824157
N-t59f11xx_1000	49292682	49438854	49286166	49428373.7	**49448787***	49406462	49213897
N-t59f11xx_300	5072978	5076210	5062886	5076707.7	**5076782***	5075720	5070127
N-t59f11xx_500	13482981	13498529	13467557	13499881.1	**13506538***	13496746	13437621
N-t59f11xx_750	29111297	29174966	29090660	29171883.0	**29192928***	29154681	29041799
N-t59i11xx_1000	3479421399	3488448681	3479518877	3489701453.0	**3491553089***	3487565188	3471997519
N-t59i11xx_300	360725987	360874820	360469832	360873412.8	**360944548***	360841288	360306443
N-t59i11xx_500	938485352	939587430	936685193	939927318.2	**940518070***	939545063	936090712
N-t59i11xx_750	2069312019	2072848283	2067523396	2073537273.0	**2074252863***	2072794399	2062282459
N-t59n11xx_1000	9583958	9610670	9584187	9613480.5	**9617008***	9608430	9569747
N-t59n11xx_300	1006450	1006889	1005872	1007056.0	**1007084***	1006985	1004921
N-t59n11xx_500	2615489	2617757	2611640	2619518.3	**2620832***	2618184	2610904
N-t59n11xx_750	5678403	5692367	5678537	5691964.7	**5695531***	5689263	5667969
N-t65b11xx_1000	223109574	223668744	222817023	223767668.4	**223853241***	223678436	222403731
N-t65b11xx_300	22160907	22173081	22150452	22176604.2	**22177266***	22175553	22149491
N-t65b11xx_500	59823290	59838132	59730424	59864273.5	**59888768***	59829694	59610554
N-t65b11xx_750	129665747	129960120	129597766	130011100.5	**130054912***	129960156	129443488
N-t65d11xx_1000	116978480	117323346	116926434	117324718.0	**117373026***	117266541	116725645
N-t65d11xx_300	11882249	11885049	11869279	11885049.0	**11885049***	11885049	11864597
N-t65d11xx_500	31785256	31816578	31734060	31829133.1	**31838356***	31814223	31716674
N-t65d11xx_750	67814379	67927668	67772458	67959475.3	**67998198***	67930289	67649620
N-t65f11xx_1000	108445234	108691075	108432808	108707409.4	**108745492***	108625811	108197222
N-t65f11xx_300	11182424	11178165	11167900	11185022.4	**11186549***	11182717	11166902
N-t65f11xx_500	29334620	29355436	29319694	29365313.1	**29384561***	29352943	29285209
N-t65f11xx_750	63313832	63440862	63303238	63462685.1	**63496233***	63446390	63208271
N-t65i11xx_1000	8412439298	8438291042	8415366771	8439201476.0	**8442803555***	8434640122	8390948152
N-t65i11xx_300	863474432	863717981	863367092	864182290.4	**864223106***	864119642	862881768
N-t65i11xx_500	2250753512	2250524485	2247172698	2254133973.0	**2255031024***	2252729837	2244382489
N-t65i11xx_750	4936200301	4947029597	4932086947	4948989053.0	**4951075948***	4946904400	4929127538
N-t65l11xx_1000	8694887	8713052	8699818	8720585.9	**8724685***	8707403	8668534

Table 16: Experimental result with xLOLIB2 package (2/10)

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			xLOLIB2 (3/10)				
	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
Instance	Best	Best	Best	Mean	Best	Worst	
N-t65l11xx_300	827768	828160	828437	828622.2	**828676***	828506	827462
N-t65l11xx_500	2331872	2334892	2332503	2335894.3	**2336198***	2335511	2328136
N-t65l11xx_750	4926635	4934030	4925112	4942390.0	**4944869***	4940006	4917873
N-t65n11xx_1000	17082517	17124223	17086500	17130091.0	**17138665***	17122140	17044635
N-t65n11xx_300	1789450	1789535	1788219	1790346.7	**1790515***	1789951	1788165
N-t65n11xx_500	4658276	4662020	4657418	4665895.2	**4667547***	4661210	4651136
N-t65n11xx_750	10063186	10085422	10062414	10089400.0	**10094359***	10083620	10042759
N-t65w11xx_1000	71817133120	71991703501	71799433807	72014229542.0	**72045429648***	71978376860	71696369800
N-t65w11xx_300	7343019786	7346235806	7340659787	7347871994.0	**7349114518***	7345297557	7339707255
N-t65w11xx_500	19412378960	19431447324	19395736616	19438924494.0	**19444171547***	19433680736	19371907957
N-t65w11xx_750	41834939327	41903636638	41852336040	41928347153.0	**41955222364***	41900545919	41737976722
N-t69r11xx_1000	398128340	399227189	397900139	399371590.9	**399611905***	399157995	397093542
N-t69r11xx_300	41128694	41122616	41089608	41155344.1	**41156777***	41143931	41051301
N-t69r11xx_500	108901441	109001028	108705348	109044209.5	**109076028***	109004463	108552960
N-t69r11xx_750	236321099	237007331	236171374	237066953.2	**237138462***	236861899	235618981
N-t70b11xxb_1000	313527570	314282716	313456613	314417699.8	**314603886***	314246936	312618951
N-t70b11xx_300	31659994	31665993	31647814	31675733.9	**31677663***	31672759	31628508
N-t70b11xx_500	84481194	84583174	84396309	84597176.8	**84625101***	84562604	84271904
N-t70b11xx_750	182130904	182502859	182100517	182552898.1	**182775821***	182451239	181536910
N-t70d11xxb_1000	194204267	194803249	194285943	194845832.5	**194905650***	194748187	193829282
N-t70d11xxb_300	19640203	19650988	19637886	19661386.9	**19661816***	19658053	19620114
N-t70d11xxb_500	52196483	52266442	52094664	52279476.8	**52284020***	52270374	52016871
N-t70d11xxb_750	112386024	112586940	112284758	112611223.7	**112657346***	112533372	112175736
N-t70d11xx_1000	204859762	205396106	204651907	205451303.3	**205598204***	205324210	204397975
N-t70d11xx_300	20833494	20845761	20836694	20850307.5	**20852769***	20849988	20804250
N-t70d11xx_500	55508957	55521572	55463592	55536933.5	**55570973***	55515795	55349813
N-t70d11xx_750	118528593	118752867	118528627	118815315.6	**118893744***	118714030	118269267
N-t70f11xx_1000	177893727	178421743	178045876	178387875.1	**178466412***	178283192	177714930
N-t70f11xx_300	17965823	17976463	17961818	17977488.4	**17977681***	17977467	17936682
N-t70f11xx_500	47928637	47963119	47871077	47988430.4	**48017411***	47964776	47857287
N-t70f11xx_750	103634607	103726462	103603925	103762113.6	**103826457***	103704427	103368757
N-t70i11xx_1000	13041003568	13077477719	13049060752	13080399907.0	**13086612063***	13072356795	13019571398

Table 17: Experimental result with xLOLIB2 package (3/10)

xLOLIB2 (4/10)

Instance	ILSr	MAr	CD-RVNS	MA-EDM			Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-t70i11xx_300	1350576340	1350238189	1348814709	1351006837.0	**1351074324***	1350617271	1347488506
N-t70i11xx_500	3494521056	3493300909	3492965171	3500249159.0	**3502053016***	3499271035	3486936667
N-t70i11xx_750	7627662119	7643792788	7627935088	7646344502.0	**7649725442***	7642933090	7611464838
N-t70k11xx_1000	28436310100	28502636900	28417078800	28510238560.0	**28520983800***	28499462200	28351747000
N-t70k11xx_300	2910886300	2912185400	2909092900	2913836290.0	**2914281600***	2912700200	2906605200
N-t70k11xx_500	7705758400	7714231500	7698481500	7717323677.0	**7717672700***	7716705300	7688243300
N-t70k11xx_750	16675120300	16714762200	16675762200	16716364877.0	**16728003100***	16707339600	16654285500
N-t70l11xx_1000	14175746	14225022	14174531	14230871.8	**14240524***	14215540	14118116
N-t70l11xx_300	1431650	1431835	1430304	1432451.9	**1432455***	1432361	1429357
N-t70l11xx_500	3804575	3809049	3802844	3813086.2	**3816527***	3810483	3800456
N-t70l11xx_750	7907514	7922328	7893062	7932155.6	**7937768***	7926652	7870995
N-t70m11xx_1000	28931698	29007238	28939633	29020331.3	**29033001***	28988800	29863606
N-t70m11xx_300	3059672	3060136	3058719	3062980.9	**3063032***	3062850	3053791
N-t70m11xx_500	7961052	7975663	7960326	7978342.2	**7982676***	7970498	7949514
N-t70m11xx_750	17000357	17029076	16985984	17030514.9	**17039695***	17021683	16959052
N-t70u11xx_1000	10244497800	10277808400	10251040900	10276181580.0	**10282938500***	10270644300	10228859000
N-t70u11xx_300	1055712900	1056161000	1055028600	1056958027.0	**1057062400***	1056550800	1054204000
N-t70u11xx_500	2761255200	2765293200	2760797800	2766288930.0	**2767279900***	2764347700	2753258600
N-t70u11xx_750	5944147400	5957373300	5943347000	5958779663.0	**5961840000***	5955670100	5936431800
N-t70w11xx_1000	1.17E+11	1.18E+11	1.17E+11	117688000000000.0	**117747387403***	1.18E+11	1.17E+11
N-t70w11xx_300	11940163732	11942655050	11928909221	11946633381.0	**11947013574***	11942944314	11924272532
N-t70w11xx_500	31542574475	31565638089	31502354129	31581653988.0	**31596828947***	31568839302	31482656885
N-t70w11xx_750	68170858705	68292441681	68146062321	68324882248.0	**68352970427***	68273617661	68013529104
N-t70x11xx_1000	1.45E+11	1.45E+11	1.45E+11	145323000000000.0	**145370973672***	1.45E+11	1.45E+11
N-t70x11xx_300	14719220350	14726741712	14712227195	14735022229.0	**14737647379***	14731330483	14699161134
N-t70x11xx_500	38919637251	38941502149	38876338800	38955146462.0	**38967606631***	38939665359	38846619405
N-t70x11xx_750	84083749929	84274008468	84053512988	84301946129.0	**84327965913***	84235795159	83877382884
N-t74d11xx_1000	311497753	312347307	311466944	312361758.8	**3125508883***	312272023	310738504
N-t74d11xx_300	31749417	31765334	31728051	31766526.9	**31767090***	31766209	31692802
N-t74d11xx_500	84441846	84564061	84373882	84555918.7	**84589925***	84519172	84276952
N-t74d11xx_750	180439669	180736324	180293591	180738044.2	**180821368***	180637450	180000000

Table 18: Experimental result with xLOLIB2 package (4/10)

xLOLIB2 (5/10)

Instance	ILSr Best	MAr Best	CD-RVNS Best	CD-RVNS Mean	MA-EDM Best	MA-EDM Worst	Best Knowns
N-t75d11xx_1000	319923602	320620498	319686291	320687432.2	**320810536***	320569292	319087189
N-t75d11xx_300	32672457	32684363	32682229	32713497.0	**32716899***	32697338	32626939
N-t75d11xx_500	86702236	86808060	86658407	86853941.6	**86902644***	86811851	86590015
N-t75d11xx_750	184775055	185041508	184616755	185102647.2	**185166486***	185034105	184396164
N-t75e11xx_1000	1390652726	1394516921	1391350244	1395188808.0	**1395787333***	1394350104	1388110876
N-t75e11xx_300	145291379	145342830	145240142	145388485.0	**145389799***	145368236	145044286
N-t75e11xx_500	375221255	375875577	375079119	375998123.4	**376164905***	375788639	374756997
N-t75e11xx_750	820542677	821770639	819893062	822020679.6	**822729527***	821332526	818104894
N-t75i11xx_1000	36377318906	36477624028	36400810586	36489114423.0	**36517061955***	36397197099	36319330625
N-t75i11xx_300	3777931329	3779722489	3776274067	3780409372.0	**3781259509***	3779624110	3771954709
N-t75i11xx_500	9769630182	9783010018	9763817929	9784784528.0	**9787845059***	9782287849	9733195049
N-t75i11xx_750	21272896646	21324947331	21266871380	21333205657.0	**21340353901***	21327356169	21233222778
N-t75k11xx_1000	52093878	52230180	52089492	52240840.4	**52258096***	52211871	52008325
N-t75k11xx_300	5334310	5337418	5330837	5338285.6	**5339512***	5335698	5329666
N-t75k11xx_500	14193531	14209411	14170116	14212354.5	**14221041***	14208469	14159503
N-t75k11xx_750	30508004	30581911	30489573	30582887.2	**30587815***	30573627	30431677
N-t75n11xx_1000	54054213	54183806	54005597	54207180.8	**54234000***	54167882	53916364
N-t75n11xx_300	5765502	5769817	5769051	5771730.2	**5774492***	5768984	5767516
N-t75n11xx_500	14955291	14968523	14924508	14973935.5	**14977389***	14971660	14882254
N-t75n11xx_750	31892118	31952179	31855865	31966212.5	**31978710***	31948901	31793642
N-t75u11xx_1000	29606447567	29701873032	29624931094	29698827656.0	**29713770054***	29682629117	29557647434
N-t75u11xx_300	3082764924	3084283182	3084538916	3085710694.0	**3086347621***	3084775898	3081481709
N-t75u11xx_500	8078682291	8086981033	8074923712	8089482986.0	**8092091464***	8086862896	8062758937
N-t75u11xx_750	17312248797	17346821361	17311414635	17350730525.0	**17358027725***	17343353805	17292801492
N-tiw56n54_1000	25868323	25945788	25877293	25948797.0	**25958420***	25937166	25823018
N-tiw56n54_300	2661218	2662176	2656014	2662901.8	**2663017***	2662737	2654641
N-tiw56n54_500	6981693	6989337	6976693	6990598.1	**6992459***	6988989	6973683
N-tiw56n54_750	15149156	15167731	15147197	15174793.9	**15180472***	15169676	15123184
N-tiw56n58_1000	35329052	35434044	35367053	35435038.4	**35451676***	35419804	35281101
N-tiw56n58_300	3610392	3608360	3606504	3611986.7	**3612583***	3611258	3603597
N-tiw56n58_500	9538741	9544092	9528842	9549175.8	**9553212***	9545481	9513598

Table 19: Experimental result with xLOLIB2 package (5/10)

xLOLIB2 (6/10)

Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-tiw56n58_750	20683105	20717493	20668017	20720453.5	**20732188***	20710559	20633749
N-tiw56n62_1000	50529543	50671308	50544571	50664050.5	**50682462***	50635764	50477512
N-tiw56n62_300	5153820	5155991	5150365	5156641.9	**5157281***	5156369	5148045
N-tiw56n62_500	13593539	13614512	13581896	13622236.5	**13626382***	13611566	13560366
N-tiw56n62_750	29466021	29526813	29452692	29541394.8	**29552470***	29527619	29427585
N-tiw56n66_1000	65664806	65842469	65707371	65875291.4	**65899344***	65830541	65543988
N-tiw56n66_300	6687156	6689351	6684195	6693976.5	**6694726***	6692546	6673467
N-tiw56n66_500	17660922	17680466	17652313	17684544.5	**17689122***	17681561	17629994
N-tiw56n66_750	38309119	38361330	38264295	38378651.8	**38933658***	38349291	38223009
N-tiw56n67_1000	75869805	76047706	75788550	76071745.9	**76101128***	76051436	75645448
N-tiw56n67_300	7694850	7703338	7683945	7707344.7	**7707409***	7706736	7684860
N-tiw56n67_500	20625090	20647552	20596761	20652392.0	**20656350***	20644054	20583929
N-tiw56n67_750	44742798	44824030	44705057	44835645.2	**44858816***	44815540	44623467
N-tiw56n72_1000	130468008	130695652	130328098	130749969.7	**130838722***	130660580	130000246
N-tiw56n72_300	13198369	13207674	13189011	13211662.7	**13215574***	13204673	13180215
N-tiw56n72_500	35282092	35336639	35246396	35340511.2	**35345596***	35323354	35188140
N-tiw56n72_750	77148447	77239295	77130734	77264112.1	**77300418***	77247178	76855797
N-tiw56r54_1000	29201789	29287259	29200964	29291193.6	**29300654***	29281522	29147432
N-tiw56r54_300	2992061	2994605	2992150	2994639.7	**2994898***	2993462	2989753
N-tiw56r54_500	7902026	7910768	7891085	7912960.8	**7914629***	7910216	7880480
N-tiw56r54_750	17116834	17144400	17110034	17154080.3	**17162918***	17143706	17095151
N-tiw56r58_1000	36955996	37033069	36979687	37057372.4	**37078259***	37014123	36886320
N-tiw56r58_300	3766202	3766357	3761863	3769741.6	**3770407***	3768678	3757785
N-tiw56r58_500	9973891	9987949	9969375	9994283.3	**9996792***	9989371	9956130
N-tiw56r58_750	21635041	21674696	21635031	21682925.6	**21690937***	21674500	21591768
N-tiw56r66_1000	60646477	60816372	60649049	60843422.3	**60883657***	60798290	60577648
N-tiw56r66_300	6191289	6194544	6181289	6196357.8	**6197206***	6194883	6179233
N-tiw56r66_500	16310785	16322138	16288804	16329910.5	**16335662***	16324590	16283320
N-tiw56r66_750	35367393	35424577	35351795	35442993.9	**35461293***	35409726	35321403
N-tiw56r67_1000	66425836	66615342	66429580	66639206.8	**66667742***	66619103	66272465
N-tiw56r67_300	6864076	6868211	6862830	6869518.5	**6869832***	6866350	6852120

Table 20: Experimental result with xLOLIB2 package (6/10)

xLOLIB2 (7/10)

Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	Best	Best	Mean	Best	Worst	
N-tiw56r67_500	18027170	18041420	17992376	18045432.8	**18055055***	18033787	17971377
N-tiw56r67_750	39689353	39786469	39652440	39795397.5	**39808906***	39769396	39570834
N-tiw56r72_1000	87804818	88047508	87776563	88079818.1	**88102798***	88049208	87558976
N-tiw56r72_300	8984191	8989289	8986533	8990800.2	**8993229***	8989866	8974248
N-tiw56r72_500	23684722	23720686	23675131	23713829.1	**23730810***	23702537	23635996
N-tiw56r72_750	51164228	51737164	51591322	51747697.8	**51762990***	51735507	51520889
N-usa79_1000	273206638	274071961	273218606	274211280.4	**274403942***	274024890	272318160
N-usa79_300	28545122	28551348	28549169	28569177.1	**28569678***	28568061	28509942
N-usa79_500	76117382	76205458	76070053	76228241.2	**76246074***	76203456	75962230
N-usa79_750	157782483	158017748	157568014	158080225.1	**158187746***	157991564	157251449
N-t70k11xx_750	16675120300	16714762200	16675762200	16716364877.0	**16728003100***	16707339600	16654285500
N-t70l11xx_1000	14175746	14225022	14174531	14230871.8	**14240524***	14215540	14118116
N-t70l11xx_300	1431650	1431835	1430304	1432451.9	**1432455***	1432361	1429357
N-t70l11xx_500	3804575	3809049	3802844	3813086.2	**3816527***	3810483	3800456
N-t70l11xx_750	7907514	7922328	7893062	7932155.6	**7937768***	7926652	7870995
N-t70n11xx_1000	28931698	29007238	28939633	29020331.3	**29033001***	28988800	29863606
N-t70n11xx_300	3059672	3060136	3058719	3062980.9	**3063032***	3062850	3053791
N-t70n11xx_500	7961052	7975663	7960326	7978342.2	**7982676***	7970498	7949514
N-t70n11xx_750	17000357	17029076	16985984	17030514.9	**17039695***	17021683	16959052
N-t70u11xx_1000	10244497800	10277808400	10251040900	10276181580.0	**10282938500***	10270644300	10228859000
N-t70u11xx_300	1055712900	1056161000	1055028600	1056958027.0	**1057062400***	1056550800	1054204000
N-t70u11xx_500	2761255200	2765293200	2760797800	2766288930.0	**2767279900***	2764347700	2753258600
N-t70u11xx_750	5944147400	5957373300	5943347000	5958779663.0	**5961840000***	5955670100	5936431800
N-t70w11xx_1000	1.17E+11	1.18E+11	1.17E+11	117688000000000.0	**117747387403***	1.18E+11	1.17E+11
N-t70w11xx_300	11940163732	11942655050	11928909221	11946633381.0	**11947013574***	11942944314	11924272532
N-t70w11xx_500	31542574475	31565638089	31502354129	31581653988.0	**31596828947***	31568839302	31482656885
N-t70w11xx_750	68170858705	68292441681	68146062321	68324882248.0	**68352970427***	68273617661	68013529104
N-t70x11xx_1000	1.45E+11	1.45E+11	1.45E+11	145323000000000.0	**145370973672***	1.45E+11	1.45E+11
N-t70x11xx_300	14719220350	14726741712	14712227195	14735022229.0	**14737647379***	14731330483	14699161134
N-t70x11xx_500	38919637251	38941502149	38876338800	38955146462.0	**38967606631***	38939665359	38846619405
N-t70x11xx_750	84083749929	84274008468	84053512988	84301946129.0	**84327965913***	84235795159	83877382884
N-t74d11xx_1000	311497753	312347307	311466944	312361758.8	**312508883***	312272023	310738504

Table 21: Experimental result with xLOLIB2 package (7/10)

xLOLIB2 (8/10)

Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best
	Best	Best	Best	Mean	Best	Worst	Knowns
N-t74d11xx_300	31749417	31765334	31728051	31766526.9	**31767090***	31766209	31692802
N-t74d11xx_500	84441846	84564061	84373882	84555918.7	**84589925***	84519172	84276952
N-t74d11xx_750	180439669	180736324	180293591	180738044.2	**180821368***	180637450	180000000
N-t75d11xx_1000	319923602	320620498	319686291	320687432.2	**320810536***	320569292	319087189
N-t75d11xx_300	32672457	32684363	32682229	32713497.0	**32716899***	32697338	32626939
N-t75d11xx_500	86702236	86808060	86658407	86853941.6	**86902644***	86811851	86590015
N-t75d11xx_750	184775055	185041508	184616755	185102647.2	**185166486***	185034105	184396164
N-t75e11xx_1000	1390652726	1394516921	1391350244	1395188808.0	**1395787333***	1394350104	1388110876
N-t75e11xx_300	145291379	145342830	145240142	145388485.0	**145389799***	145368236	145044286
N-t75e11xx_500	375221255	375875577	375079119	375998123.4	**376164905***	375788639	374756997
N-t75e11xx_750	820542677	821770639	819893062	822020679.6	**822729527***	821332526	818104894
N-t75i11xx_1000	36377318906	36477624028	36400810586	36489114423.0	**36517061955***	36397197099	36319330625
N-t75i11xx_300	3777931329	3779722489	3776274067	3780409372.0	**3781259509***	3779624110	3771954709
N-t75i11xx_500	9769630182	9783010018	9763817929	9784784528.0	**9787845059***	9782287849	9733195049
N-t75i11xx_750	21272896646	21324947331	21266871380	21333205657.0	**21340353901***	21327356169	21233222778
N-t75k11xx_1000	52093878	52230180	52089492	52240840.4	**52258096***	52211871	52008325
N-t75k11xx_300	5334310	5337418	5330837	5338285.6	**5339512***	5335698	5329666
N-t75k11xx_500	14193531	14209411	14170116	14212354.5	**14221041***	14208469	14159503
N-t75k11xx_750	30508004	30581911	30489573	30582887.2	**30587815***	30573627	30431677
N-t75n11xx_1000	54054213	54183806	54005597	54207180.8	**54234000***	54167882	53916364
N-t75n11xx_300	5765502	5769817	5769051	5771730.2	**5774492***	5768984	5767516
N-t75m11xx_500	14955291	14968523	14924508	14973935.5	**14977389***	14971660	14882254
N-t75m11xx_750	31892118	31952179	31855865	31966212.5	**31978710***	31948901	31793642
N-t75u11xx_1000	29606447567	29701873032	29624931094	29698827656.0	**29713770054***	29682629117	29557647434
N-t75u11xx_300	3082764924	3084283182	3084538916	3085710694.0	**3086347621***	3084775898	3081481709
N-t75u11xx_500	8078682291	8086981033	8074923712	8089482986.0	**8092091464***	8086862896	8062758937
N-t75u11xx_750	17312248797	17346821361	17311414635	17350730525.0	**17358027725***	17343353805	17292801492
N-tiw56n54_1000	25868323	25945788	25877293	25948797.0	**25958420***	25937166	25823018
N-tiw56n54_300	2661218	2662176	2656014	2662901.8	**2663017***	2662737	2654641
N-tiw56n54_500	6981693	6989337	6976693	6990598.1	**6992459***	6988989	6973683
N-tiw56n54_750	15149156	15167731	15147197	15174793.9	**15180472***	15169676	15123184

Table 22: Experimental result with xLOLIB2 package (8/10)

			xLOLIB2 (9/10)				
Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best
	Best	Best	Best	Mean	Best	Worst	Knowns
N-tiw56n58_1000	35329052	35434044	35367053	35435038.4	35451676*	35419804	35281101
N-tiw56n58_300	3610392	3608360	3606504	3611986.7	3612583*	3611258	3603597
N-tiw56n58_500	9538741	9544092	9528842	9549175.8	9553212*	9545481	9513598
N-tiw56n58_750	20683105	20717493	20668017	20720453.5	20732188*	20710559	20633749
N-tiw56n62_1000	50529543	50671308	50544571	50664050.5	50682462*	50635764	50477512
N-tiw56n62_300	5153820	5155991	5150365	5156641.9	5157281*	5156369	5148045
N-tiw56n62_500	13593539	13614512	13581896	13622236.5	13626382*	13611566	13560366
N-tiw56n62_750	29466021	29526813	29452692	29541394.8	29552470*	29527619	29427585
N-tiw56n66_1000	65664806	65842469	65707371	65875291.4	65899344*	65830541	65543988
N-tiw56n66_300	6687156	6689351	6684195	6693976.5	6694726*	6692546	6673467
N-tiw56n66_500	17660922	17680466	17652313	17684544.5	17689122*	17681561	17629994
N-tiw56n66_750	38309119	38361330	38264295	38378651.8	38393658*	38349291	38223009
N-tiw56n67_1000	75869805	76047706	75788550	76071745.9	76101128*	76051436	75645448
N-tiw56n67_300	7694850	7703338	7683945	7707344.7	7707409*	7706736	7684860
N-tiw56n67_500	20625090	20647552	20596761	20652392.0	20656350*	20644054	20583929
N-tiw56n67_750	44742798	44824030	44705057	44835645.2	44858816*	44815540	44623467
N-tiw56n72_1000	130468008	130695652	130328098	130749969.7	130838722*	130660580	130000246
N-tiw56n72_300	13198369	13207674	13189011	13211662.7	13215574*	13204673	13180215
N-tiw56n72_500	35282092	35336639	35246396	35340511.2	35345596*	35323354	35188140
N-tiw56n72_750	77148447	77239295	77130734	77264112.1	77300418*	77247178	76855797
N-tiw56r54_1000	29201789	29287259	29200964	29291193.6	29300654*	29281522	29147432
N-tiw56r54_300	2992061	2994605	2992150	2994639.7	2994898*	2993462	2989753
N-tiw56r54_500	7902026	7910768	7891085	7912960.8	7914629*	7910216	7880480
N-tiw56r54_750	17116834	17144400	17110034	17154080.3	17162918*	17143706	17095151
N-tiw56r58_1000	36955996	37033069	36979687	37057372.4	37078259*	37014123	36886320
N-tiw56r58_300	3766202	3766357	3761863	3769741.6	3770407*	3768678	3757785
N-tiw56r58_500	9973891	9987949	9969375	9994283.3	9996792*	9989371	9956130

Table 23: Experimental result with xLOLIB2 package (9/10)

xLOLIB2 (10/10)

Instance	ILSr	MAr	CD-RVNS		MA-EDM		Best Knowns
	Best	*Best*	*Best*	*Mean*	*Best*	*Worst*	
N-tiw56r58_750	21635041	21674696	21635031	21682925.6	**21690937***	21674500	21591768
N-tiw56r66_1000	60646477	60816372	60649049	60843422.3	**60883657***	60798290	60577648
N-tiw56r66_300	6191289	6194544	6181289	6196357.8	**6197206***	6194883	6179233
N-tiw56r66_500	16310785	16322138	16288804	16329910.5	**16355662***	16324590	16283320
N-tiw56r66_750	35367393	35424577	35351795	35442993.9	**35461293***	35409726	35321403
N-tiw56r67_1000	66425836	66615342	66429580	66639206.8	**66667742***	66619103	66272465
N-tiw56r67_300	6864076	6868211	6862830	6869518.5	**6869832***	6866350	6852120
N-tiw56r67_500	18027170	18041420	17992376	18045432.8	**18055055***	18033787	17971377
N-tiw56r67_750	39689353	39786469	39652440	39795397.5	**39808906***	39769396	39570834
N-tiw56r72_1000	87804818	88047508	87776563	88079818.1	**88102798***	88049208	87558976
N-tiw56r72_300	8984191	8989289	8986533	8990800.2	**8993229***	8989866	8974248
N-tiw56r72_500	23684722	23720686	23675131	23713829.1	**23730810***	23702537	23635996
N-tiw56r72_750	51664228	51737164	51591322	51747697.8	**51762990***	51735507	51520889
N-usa79_1000	273206638	274071961	273218606	274211280.4	**274403942***	274024890	272318160
N-usa79_300	28545122	28551348	28549169	28569177.1	**28569678***	28568061	28509942
N-usa79_500	76117382	76205458	76070053	76228241.2	**76246074***	76203456	75962230
N-usa79_750	157782483	158017748	157568014	158080225.1	**158187746***	157991564	157251449

Table 24: Experimental result with xLOLIB2 package (10/10)

1 Diversity and fitness performance figures for a representative instance of each LOLIB package

The following figures show the performance of the algorithms with a randomly instance selected from the LOLIB packages: IO, MB, RandA1, RandA2, RandB, SGB, Spec and xLOLIB. These figures show the diversity behavior in Mar and MA-EDM population algorithms, as well as the evolution of the fitness every ten minutes when running each algorithm for four hours.These figures complement the information presented in the experimental study section of the main paper. As we can see in the nexts figures the MA-EDM present a diversity thorough treatment in contrast with the MAr which does not have any explicit diversity treatment. On the other hand we can assert that in the fitness evolution figures the MA-EDM always have better performance than the others algorithms studied in this research. These results are similar to those shown in the main document results section.
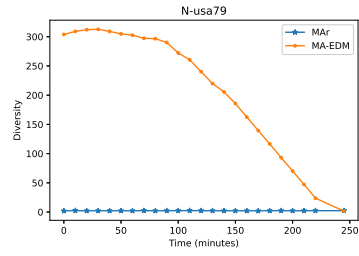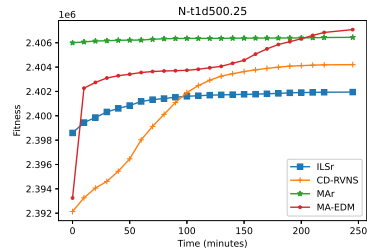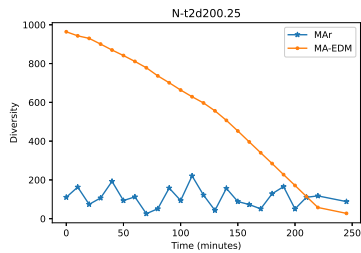

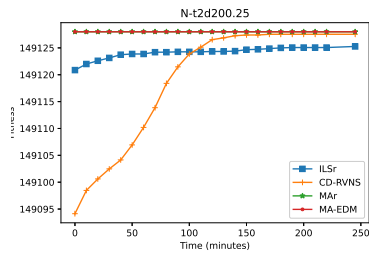
(a) IO:N-usa79
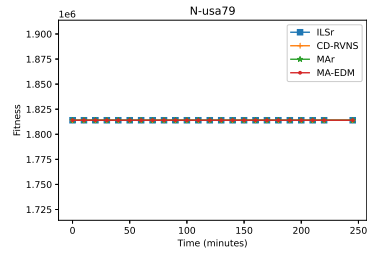
(b) IO:N-usa79
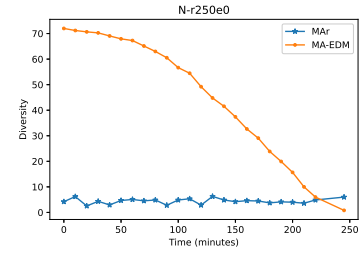
(c) MB:N-r250e0
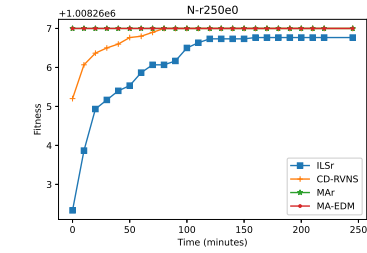
(d) MB:N-r250e0
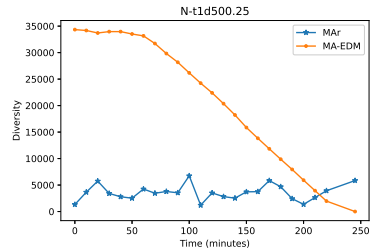
(e) RandA1:N-t1d500.25

(f) RandA1:N-t1d500.25

(g) RandA2:N-t2d200.25

(h) RandA2:N-t2d200.25

(a) RandB:N-p50-20

(b) RandB:N-p50-20

(c) SGB:N-sgb75.25

(d) SGB:N-sgb75.25

(e) Spec:N-atp452

(f) Spec:N-atp452

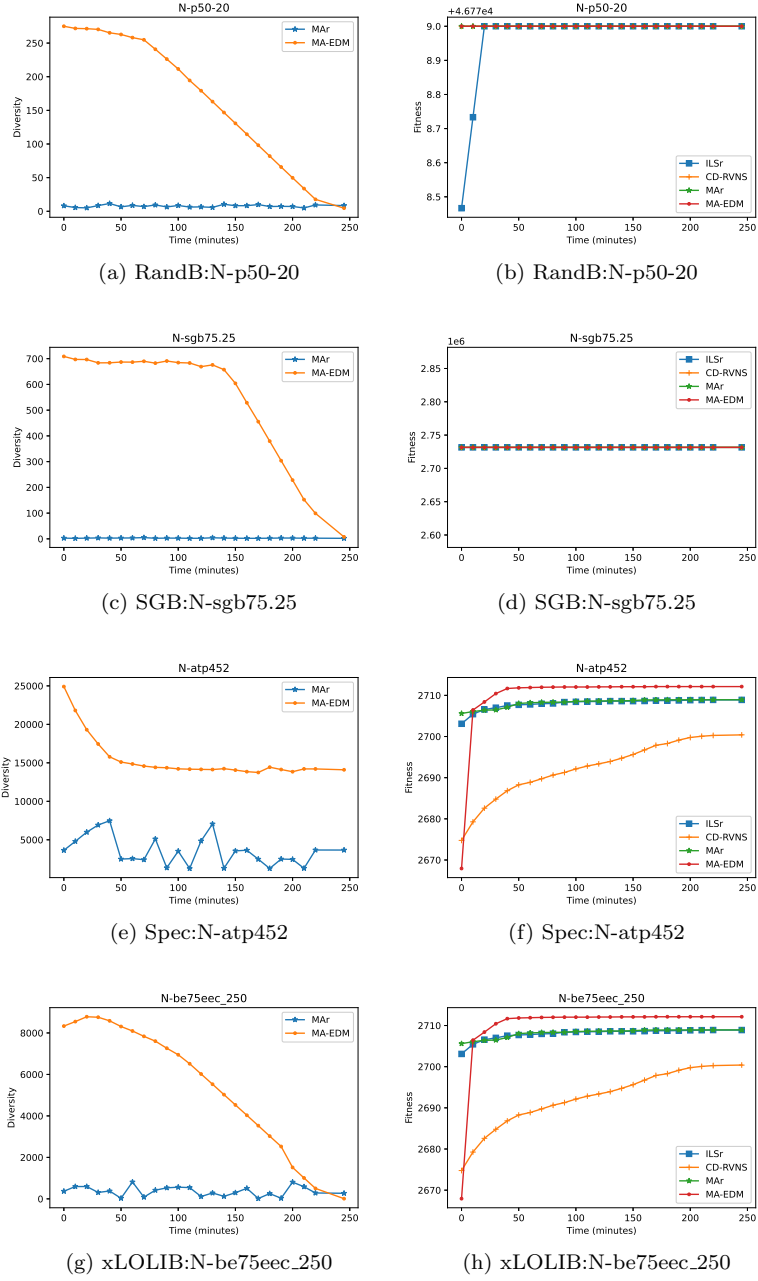(g) xLOLIB:N-be75eec_250

(h) xLOLIB:N-be75eec_250

Figure 1: Diversity behaviour in MA-EDM and MAr algorithms and fitness evolution in ten minutes for all the study algorithms through four hours of executions for one representative instance: N-usa79 from IO, N-r250e0 from MB and N-t1d500.25 from RandA1, N-t2d200.25 from RandA2, N-p50-20 from RandB, N-sgb75.25 from SGB,N-atp452 from Spec and N-be75eec_250 from xLOLIB