

A Variable Neighborhood Search for the Generalized Vehicle Routing Problem with Stochastic Demands – Full Result Tables

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1 Scope

This document contains the full result tables of the tests performed with our variable neighborhood search as described in the paper “A Variable Neighborhood Search for the Generalized Vehicle Routing Problem with Stochastic Demands” accepted by the EvoCOP 2015 conference.

2 Results

All tests were carried out on a single core of an Intel Xeon Quadcore with 2.53 GHz and aborted after 10.000 seconds. Table 1 shows the results of the tests for the different types of the VND as described in the paper for instances with $\theta = 2$ and Table 2 lists the results for the instances with $\theta = 3$.

Table 1: Results for the different configurations of the VND for instances with $\theta = 2$.

Instance	n	m	$E[nr]$	FI + VND		GTSP + VND		GTSP + VND + ML-ES	
				obj	$t[s]$	obj	$t[s]$	obj	$t[s]$
P-n16-k8-C8-V5	16	8	4,2	208,511	1	208,158	1	208,158	1
P-n19-k2-C10-V2	19	10	1,08	146,825	13	146,825	<1	146,825	<1
P-n20-k2-C10-V2	20	10	1,04	149,024	13	149,024	<1	149,024	<1
P-n21-k2-C11-V2	21	11	1,04	162,77	21	160,481	<1	160,481	<1
P-n22-k2-C11-V2	22	11	1,04	161,365	24	162,952	18	162,952	8
P-n22-k8-C11-V5	22	11	3,87	326,225	5425	326,225	4988	326,225	190
P-n23-k8-C12-V5	23	12	4,53	313,084	8	312,512	2	312,512	2
B-n31-k5-C16-V3	31	16	2,03	419,912	57	419,912	23	419,912	25
A-n32-k5-C16-V2	32	16	2	547,267	65	539,161	20	539,161	12
A-n33-k5-C17-V3	33	17	2,33	455,146	96	455,665	39	455,665	7
A-n33-k6-C17-V3	33	17	2,74	468,337	87	468,775	31	468,775	4
A-n34-k5-C17-V3	34	17	2,25	541,021	73	504,136	36	504,136	6
B-n34-k5-C17-V3	34	17	2,05	466,803	113	466,803	43	466,803	25
B-n35-k5-C18-V3	35	18	2,23	619,24	115	619,24	45	619,24	26
A-n36-k5-C18-V2	36	18	1,98	506,953	146	506,953	36	506,953	7
A-n37-k5-C19-V3	37	19	2,1	447,859	145	447,859	131	447,859	19
A-n37-k6-C19-V3	37	19	2,93	626,813	165	610,072	59	610,072	13
A-n38-k5-C19-V3	38	19	2,42	485,88	124	481,977	0	481,977	0
B-n38-k6-C19-V3	38	19	2,75	487,754	157	479,918	67	479,918	27
A-n39-k5-C20-V3	39	20	2,47	567,414	210	567,906	77	567,906	14
A-n39-k6-C20-V3	39	20	2,68	560,574	301	561,253	72	561,253	20
B-n39-k5-C20-V3	39	20	2,33	356,43	220	356,484	<1	356,484	<1
P-n40-k5-C20-V3	40	20	2,26	299,248	480	296,443	133	296,443	10
B-n41-k6-C21-V3	41	21	2,88	483,257	360	483,257	106	483,257	28
B-n43-k6-C22-V3	43	22	2,78	490,23	337	490,23	165	490,23	77
A-n44-k6-C22-V3	44	22	2,91	628,954	332	627,856	211	627,856	44
B-n44-k7-C22-V4	44	22	3,16	559,111	435	563,957	126	563,957	80
A-n45-k6-C23-V4	45	23	3,12	622,394	405	621,23	150	621,23	31
A-n45-k7-C23-V4	45	23	3,16	704,585	476	692,887	219	692,887	97
B-n45-k5-C23-V3	45	23	2,45	502,021	447	502,021	285	502,021	34
B-n45-k6-C23-V4	45	23	3,05	480,861	491	482,913	182	482,913	92
P-n45-k5-C23-V3	45	23	2,35	342,329	865	340,48	388	340,48	34
A-n46-k7-C23-V4	46	23	3,12	624,051	578	624,051	156	624,051	62
A-n48-k7-C24-V4	48	24	3,25	693,444	684	686,417	249	686,417	152
B-n50-k7-C25-V4	50	25	3,01	454,088	715	454,088	216	454,088	34
B-n50-k8-C25-V5	50	25	4,26	951,949	659	923,532	292	923,532	199
P-n50-k10-C25-V5	50	25	4,77	428,477	516	431,461	296	431,461	131
P-n50-k7-C25-V4	50	25	3,18	354,473	1133	354,467	599	354,467	58
P-n50-k8-C25-V4	50	25	3,98	400,619	666	377,659	255	377,659	57
B-n51-k7-C26-V4	51	26	3,56	699,957	650	682,701	157	682,701	61
P-n51-k10-C26-V6	51	26	5,04	480,028	691	451,79	138	451,79	58
B-n52-k7-C26-V4	52	26	3,12	461,436	888	458,949	427	458,949	91
A-n53-k7-C27-V4	53	27	3,38	643,524	801	637,534	442	637,534	110
A-n54-k7-C27-V4	54	27	3,43	719,822	1126	722,494	287	722,494	91
A-n55-k9-C28-V5	55	28	4,18	733,084	1013	733,496	405	733,496	145
P-n55-k10-C28-V5	55	28	4,72	424,796	1639	424,598	570	424,598	111
P-n55-k15-C28-V8	55	28	7,76	563,252	618	560,924	204	560,924	91
P-n55-k7-C28-V4	55	28	3,19	361,871	3080	374,094	615	374,094	78
P-n55-k8-C28-V4	55	28	3,39	362,202	2885	362,205	1269	362,205	108
B-n56-k7-C28-V4	56	28	3,19	474,611	1100	478,102	497	478,102	313
B-n57-k7-C29-V4	57	29	3,68	766,237	1377	779,483	803	779,483	446
B-n57-k9-C29-V5	57	29	4,19	1018,781	1569	967,332	481	967,332	395
A-n60-k9-C30-V5	60	30	4,11	897,263	1617	816,393	597	816,393	257
P-n60-k10-C30-V5	60	30	4,83	459,237	2078	455,262	749	455,262	225
P-n60-k15-C30-V8	60	30	7,23	580,988	1136	572,084	748	572,084	316
A-n61-k9-C31-V5	61	31	4,51	644,702	2465	662,945	746	662,945	181
A-n62-k8-C31-V4	62	31	3,66	794,707	1680	755,773	960	755,773	261
A-n63-k10-C32-V5	63	32	4,69	851,511	2033	830,794	904	830,794	438
A-n63-k9-C32-V5	63	32	4,52	980,597	3037	946,39	578	946,39	229
B-n63-k10-C32-V5	63	32	4,41	881,188	1933	852,866	642	852,866	475
A-n64-k9-C32-V5	64	32	4,11	831,768	3232	837,309	563	837,309	352
B-n64-k9-C32-V5	64	32	4,17	514,915	2574	514,915	984	514,915	234
A-n65-k9-C33-V5	65	33	4,14	726,861	2908	712,743	1050	712,743	509
P-n65-k10-C33-V5	65	33	4,78	498,862	4287	501,391	1668	501,391	336
B-n66-k9-C33-V5	66	33	4,36	830,581	2983	818,424	816	818,424	590
B-n67-k10-C34-V5	67	34	4,59	692,05	3376	674,948	946	674,948	647
B-n68-k9-C34-V5	68	34	4,17	721,533	3519	738,479	971	738,479	507
A-n69-k9-C35-V5	69	35	4,3	695,626	3547	711,188	1012	711,188	379
P-n70-k10-C35-V5	70	35	4,79	512,773	6176	504,961	2145	504,961	336
P-n76-k4-C38-V2	76	38	1,95	844,06	>10000	394,195	>10000	394,195	366
P-n76-k5-C38-V3	76	38	2,44	701,248	>10000	410,097	>10000	409,933	439
B-n78-k10-C39-V5	78	39	4,89	843,099	7736	830,6	3335	830,6	1375
A-n80-k10-C40-V5	80	40	4,43	1065,212	8307	1049,388	2035	1049,388	1745
M-n101-k10-C51-V5	101	51	4,73	1430,448	>10000	550,072	>10000	545,681	4000
P-n101-k4-C51-V2	101	51	1,83	1646,051	>10000	468,871	>10000	461,77	780
M-n121-k7-C61-V4	121	61	3,54	2881,864	>10000	765,489	>10000	760,821	>10000
M-n151-k12-C76-V6	151	76	5,69	2398,81	>10000	731,037	>10000	714,182	>10000
M-n200-k16-C100-V8	200	100	7,92	3314,08	>10000	905,613	>10000	906,447	>10000
G-n262-k25-C131-V12	262	131	11,79	13691,641	>10000	3666,883	>10000	3667,864	>10000

Table 2: Results for the different configurations of the VND for instances with $\theta = 3$.

Instance	n	m	$E[nr]$	FI + VND		GTSP + VND		GTSP + VND + ML-ES	
				obj	$t[s]$	obj	$t[s]$	obj	$t[s]$
P-n16-k8-C6-V4	16	6	3	162,17	<1	162,17	<1	162,17	<1
P-n19-k2-C7-V1	19	7	0,71	112,105	5	112,105	3	112,105	<1
P-n20-k2-C7-V1	20	7	0,68	117,306	4	117,306	<1	117,306	<1
P-n21-k2-C7-V1	21	7	0,64	117,071	3	117,071	<1	117,071	<1
P-n22-k2-C8-V1	22	8	0,73	111,194	10	111,194	5	111,194	<1
P-n22-k8-C8-V4	22	8	2,82	246,082	2681	246,082	1927	246,082	97
P-n23-k8-C8-V3	23	8	2,55	194,018	2	183,586	1	183,586	1
B-n31-k5-C11-V2	31	11	1,38	355,729	25	355,729	16	355,729	5
A-n32-k5-C11-V2	32	11	1,39	386,909	20	388,597	10	388,597	2
A-n33-k5-C11-V2	33	11	1,52	318,028	17	318,028	15	318,028	3
A-n33-k6-C11-V2	33	11	1,91	367,629	23	367,629	16	367,629	4
A-n34-k5-C12-V2	34	12	1,66	419,124	29	419,124	25	419,124	4
B-n34-k5-C12-V2	34	12	1,34	363,089	33	363,089	13	363,089	5
B-n35-k5-C12-V2	35	12	1,54	501,47	32	501,47	14	501,47	6
A-n36-k5-C12-V2	36	12	1,34	404,579	30	399,905	23	399,905	7
A-n37-k5-C13-V2	37	13	1,43	359,133	45	359,133	20	359,133	3
A-n37-k6-C13-V2	37	13	1,95	467,266	31	430,987	32	430,987	7
A-n38-k5-C13-V2	38	13	1,71	371,795	57	371,795	20	371,795	2
B-n38-k6-C13-V2	38	13	1,93	386,195	55	389,241	27	389,241	7
A-n39-k5-C13-V2	39	13	1,48	390,4	47	371,41	20	371,41	8
A-n39-k6-C13-V2	39	13	1,83	417,844	43	417,844	40	417,844	8
B-n39-k5-C13-V2	39	13	1,45	281,482	50	281,482	<1	281,482	<1
P-n40-k5-C14-V2	40	14	1,51	214,775	175	214,753	49	214,753	4
B-n41-k6-C14-V2	41	14	1,82	404,261	93	404,261	34	404,261	11
B-n43-k6-C15-V2	43	15	1,81	394,529	74	347,65	33	347,65	6
A-n44-k6-C15-V2	44	15	2	505,129	105	508,981	51	508,981	15
B-n44-k7-C15-V3	44	15	2,24	402,02	119	402,02	57	402,02	25
A-n45-k6-C15-V3	45	15	2,09	478,219	105	478,219	56	478,219	12
A-n45-k7-C15-V3	45	15	2,06	516,508	94	488,017	99	488,017	34
B-n45-k5-C15-V2	45	15	1,51	419,613	116	419,613	59	419,613	8
B-n45-k6-C15-V2	45	15	1,96	358,989	72	358,989	83	358,989	31
P-n45-k5-C15-V2	45	15	1,61	239,568	172	239,357	94	239,357	6
A-n46-k7-C16-V3	46	16	2,08	465,624	209	471,98	82	471,98	16
A-n48-k7-C16-V3	48	16	2,13	474,21	150	462,548	95	462,548	35
B-n50-k7-C17-V3	50	17	2,05	398,38	160	398,38	103	398,38	33
B-n50-k8-C17-V3	50	17	2,72	600,656	169	605,714	123	605,714	23
P-n50-k10-C17-V4	50	17	3,32	302,371	181	302,371	106	302,371	23
P-n50-k7-C17-V3	50	17	2,21	261,343	402	261,343	214	261,343	19
P-n50-k8-C17-V3	50	17	2,77	273,27	276	273,27	134	273,27	17
B-n51-k7-C17-V3	51	17	2,44	513,021	184	513,021	64	513,021	11
P-n51-k10-C17-V4	51	17	3,31	313,594	162	313,41	94	313,41	27
B-n52-k7-C18-V3	52	18	2,18	360,496	269	360,496	143	360,496	21
A-n53-k7-C18-V3	53	18	2,09	450,973	268	443,875	97	443,875	16
A-n54-k7-C18-V3	54	18	2,19	507,805	201	490,544	134	490,544	41
A-n55-k9-C19-V3	55	19	2,75	475,919	292	474,048	114	474,048	15
P-n55-k10-C19-V4	55	19	3,21	311,949	300	316,648	254	316,648	54
P-n55-k15-C19-V6	55	19	5,27	402,374	290	396,226	204	396,226	66
P-n55-k7-C19-V3	55	19	2,17	275,083	781	274,223	496	274,223	31
P-n55-k8-C19-V3	55	19	2,31	276,328	796	276,328	393	276,328	27
B-n56-k7-C19-V3	56	19	2,2	357,843	264	358,882	109	358,882	25
B-n57-k7-C19-V3	57	19	2,39	569,003	317	567,698	287	567,698	128
B-n57-k9-C19-V3	57	19	2,55	691,991	377	693,717	285	693,717	124
A-n60-k9-C20-V3	60	20	2,8	614,515	517	620,897	361	620,897	117
P-n60-k10-C20-V4	60	20	3,19	340,535	627	328,893	324	328,893	36
P-n60-k15-C20-V5	60	20	4,78	372,634	428	372,634	156	372,634	57
A-n61-k9-C21-V4	61	21	3,09	495,72	528	482,511	219	482,511	61
A-n62-k8-C21-V3	62	21	2,59	629,651	382	617,56	260	617,56	93
A-n63-k10-C21-V4	63	21	3,14	627,932	398	611,536	283	611,536	80
A-n63-k9-C21-V3	63	21	2,96	678,592	398	666,458	277	666,458	109
B-n63-k10-C21-V3	63	21	2,9	604,49	460	604,701	181	604,701	50
A-n64-k9-C22-V3	64	22	2,55	551,108	786	564,462	417	564,462	145
B-n64-k9-C22-V4	64	22	3,17	457,245	640	457,245	337	457,245	85
A-n65-k9-C22-V3	65	22	2,89	550,806	683	525,03	259	525,03	90
P-n65-k10-C22-V4	65	22	3,23	378,526	1326	378,526	1082	378,526	123
B-n66-k9-C22-V3	66	22	2,8	649,179	568	627,357	279	627,357	121
B-n67-k10-C23-V4	67	23	3,14	561,816	934	561,712	385	561,712	109
B-n68-k9-C23-V3	68	23	2,87	546,556	715	539,815	441	539,815	131
A-n69-k9-C23-V3	69	23	2,94	523,774	1130	523,774	389	523,774	88
P-n70-k10-C24-V4	70	24	3,36	390,951	1649	386,148	1088	386,148	120
P-n76-k4-C26-V2	76	26	1,33	461,753	>10000	310,397	4312	310,397	58
P-n76-k5-C26-V2	76	26	1,67	373,937	>10000	310,397	3748	310,397	56
B-n78-k10-C26-V4	78	26	3,31	620,112	1941	620,112	774	620,112	342
A-n80-k10-C27-V4	80	27	3,04	760,272	1878	757,547	943	757,547	381
M-n101-k10-C34-V4	101	34	3,2	720,202	>10000	465,866	9949	465,866	958
P-n101-k4-C34-V2	101	34	1,25	992,679	>10000	371,926	9979	371,926	397
M-n121-k7-C41-V3	121	41	2,44	1480,015	>10000	559,549	>10000	550,556	5051
M-n151-k12-C51-V4	151	51	3,71	1542,827	>10000	526,302	>10000	491,768	9090
M-n200-k16-C67-V6	200	67	5,29	2315,641	>10000	661,227	>10000	657,803	8382
G-n262-k25-C88-V9	262	88	8,13	8582,402	>10000	2756,278	>10000	2757,088	>10000