Babeș-Bolyai University
Faculty of Mathematics and Computer Science
August 2, 2024

Experimental Results of Granular Ball with Ant Colony Algorithm (GB-ACA)

1 Problems encountered with the code

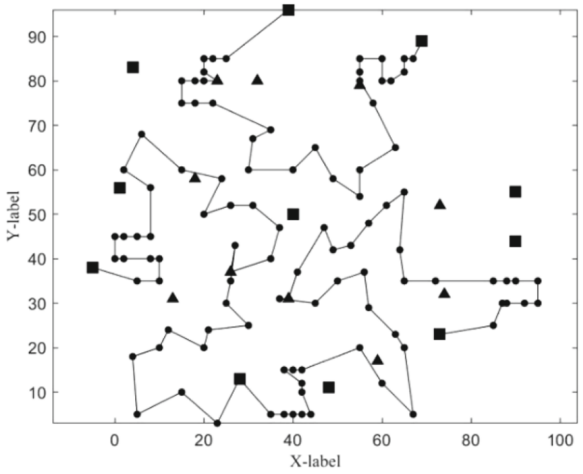

Figure 1: IACA

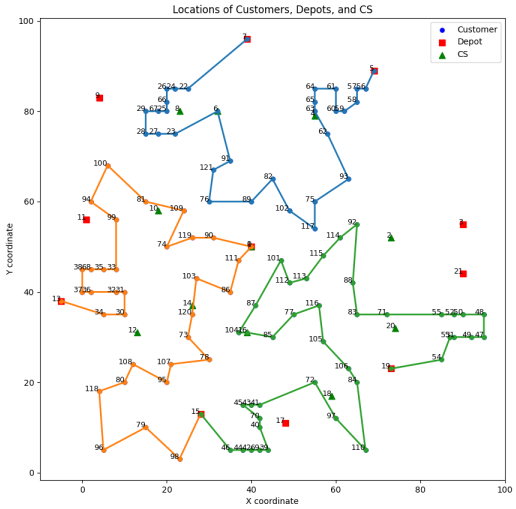

Figure 2: GB-ACA

Figure 3: Comparison of IACA and GB-ACA paths in instance RC202

As shown in the figure 3, the movement direction of the ants in the two experiments is the same, taking the blue path as an example, the ants start from depot 5 and return at depot 7. But although the paths are the same, the charging position is different in both, in my experiment, the ants need to charge after reaching node 91, but in IACA the ants can reach node 25 before charging. What I don't understand is why the same path but different power consumption. Similarly this is the case in the orange path. I can't find the reason.

2 Experimental Results

Table 1: Test results for different test instances

TN	Method	TD	TC	EC	VC	SC	CC	RP	RT
C101	GB-ACA	**510.04**	1035.70	360.00	**299.59**	300.00	76.11	73.70	23.85
	IACA	546.14	1003.78	360.00	316.13	300.00	27.65	-	20.35
R101	GB-ACA	702.72	1182.08	360.00	446.29	300.00	75.78	23.95	40.17
	IACA	685.98	1109.85	360.00	391.19	300.00	58.66	-	20.43
RC101	GB-ACA	**666.53**	1133.31	360.00	398.13	300.00	75.19	25.72	33.94
	IACA	667.01	1105.83	360.00	393.24	300.00	52.59	-	20.27
C201	GB-ACA	**590.06**	1097.53	360.00	**359.51**	300.00	78.01	55.05	21.13
	IACA	638.42	1070.47	360.00	362.97	300.00	47.50	-	20.97
R201	GB-ACA	694.18	1179.00	360.00	442.06	300.00	76.94	28.25	30.41
	IACA	679.45	1113.54	360.00	398.36	300.00	55.18	-	20.91
RC201	GB-ACA	666.53	1138.71	360.00	405.24	300.00	73.48	24.32	34.01
	IACA	665.34	1102.03	360.00	389.43	300.00	52.60	-	20.90
AVE	GB-ACA	**638.68**	1127.39	360.00	391.80	300.00	75.92	38.83	30.25
	IACA	647.39	1084.58	360.00	375.55	300.00	49.03	-	20.64

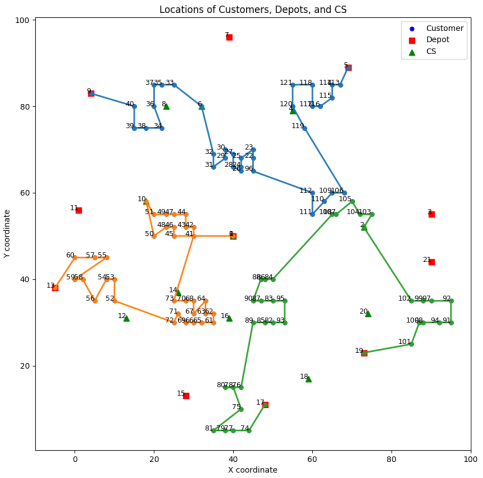

Figure 4: C101

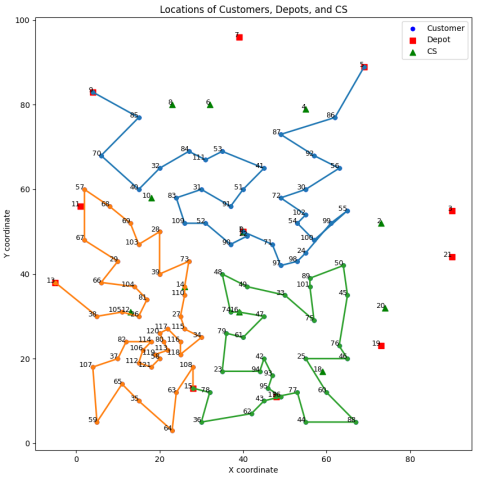

Figure 5: R101

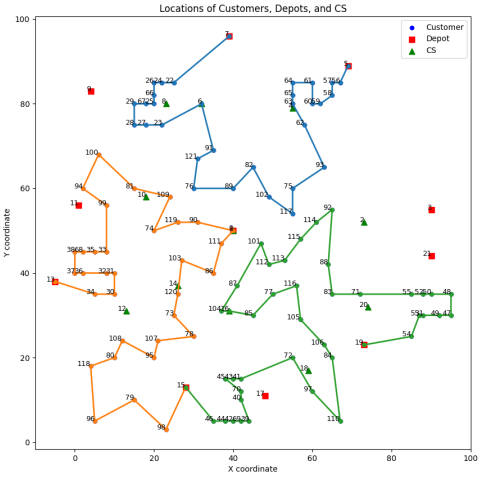

Figure 6: RC101

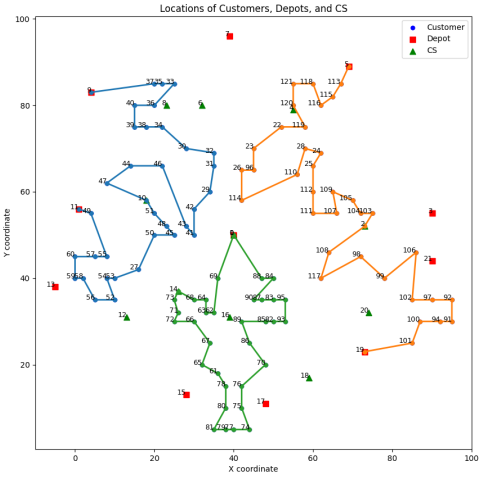

Figure 7: C201

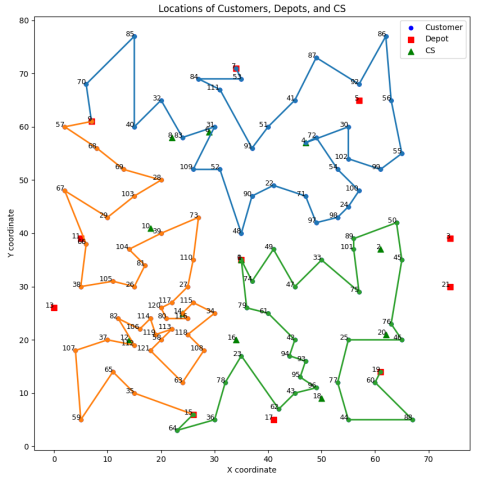

Figure 8: R201

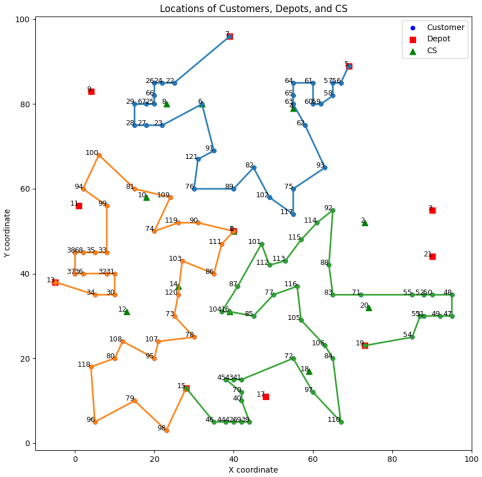

Figure 9: RC201