When searching for the best values for coefficients γ and δ (Fig. 8), we find the situation different. Neither the influence of the distance between the node and depot (γ) nor the influence of ant's capacity (δ) when computing probabilities proved to affect the solution positively in our algorithm, thus the best values are $\gamma = 0$ and $\delta = 0$.

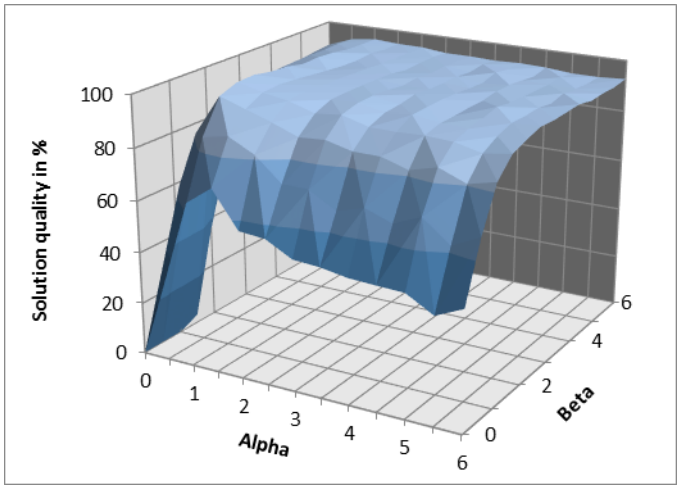

Fig. 7 Solution quality as a function of coefficients α, β

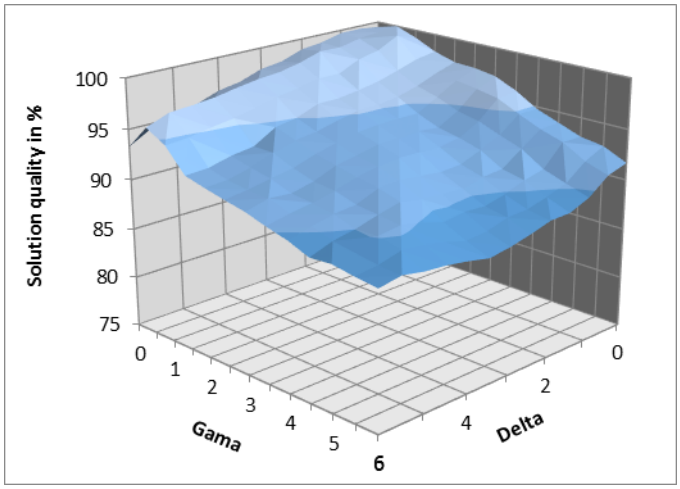

Fig. 8 Solution quality as a function of coefficients γ, δ

IV. Results and Conclusions

We verified the ACO algorithm on benchmarks problems consisting of Cordeau's MDVRP instances [7]. Values of parameters of the algorithm were set according to our experiences gained from the parameter tuning process described in Section III.

Table 1 presents the results for the benchmark instances. We conducted 100 tests on each instance and registered the best solution found, the mean along with the standard deviation. The best known solutions are received from [7].

The results show that error (the difference between our solution and the best known solution) is in no case bigger than 3%. In two cases (p01 and p12), we managed to find the best known solution.

Table 1 Results for MDVRP benchmark instances

Inst.	NoN	NoD	BKS	OBS	Mean	Stdev	Error
p01	50	4	576.87	576.87	583.15	6.50	0.00%
p02	50	4	473.53	475.86	482.86	3.44	0.49%
p03	75	5	641.19	644.46	650.04	4.12	0.51%
p04	100	2	1001.59	1018.49	1035.39	5.69	1.69%
p05	100	2	750.03	755.71	763.09	3.68	0.76%
p06	100	3	876.50	885.84	899.51	4.89	1.07%
p07	100	4	885.80	895.53	912.48	5.62	1.10%
p08	249	2	4420.95	4445.51	4572.23	66.75	0.56%
p09	249	3	3900.22	3990.19	4145.33	96.89	2.31%
p10	249	4	3663.02	3751.50	3864.92	50.21	2.42%
p11	249	5	3554.18	3657.16	3760.60	38.94	2.90%
p12	80	2	1318.95	1318.95	1320.48	1.90	0.00%
p15	160	4	2505.42	2510.11	2576.27	18.46	0.19%
p18	240	6	3702.85	3741.80	3812.25	37.22	1.05%
p21	360	9	5474.84	5631.12	5788.19	46.64	2.85%

NoN – number of nodes, NoD – number of depots
BKS – best known solution, OBS – our best solution

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