New improvements in the cutting plane for the Capacitated Arc Routing Problem

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Almost twenty years ago Belenguer and Benavent (2003) published a cutting plane algorithm for the Capacitated Arc Routing Problem (CARP) which quickly provides good lower levels. Some of the inequalities and separation algorithms that were proposed have been widely used in that problem and in other Arc Routing Problems with capacities.

This work presents some improvements that may improve the lower boundary obtained. The first of these focuses on capacity constraints. For each of these constraints, we calculate a lower bound on the number of vehicles needed to serve the corresponding required edges and assume that each of these vehicles traverses the edge cutset twice. However, in some cases, we can be sure that one or more of these vehicles will traverse the edge cutset more than twice. In those cases, the rhs of the capacity constraint may be increased. Other improvement can be obtained by adapting the generalised capacity constraints of the CVRP to CARP.

Finally, preliminary computational results including improvements in the cutting plane algorithm are presented. In addition, some open problems that arise will be presented.

References

[1] Belenguer, J. M. and Benavent, E., "A cutting plane algorithm for the capacitated arc routing problem", *Computers & Operations Research* 30(5), 705-728, 2003.