Heuristic approach for routing vehicles for Dengue control

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In Brazil, more than 115 thousand cases of dengue were reported in 2022, ranking it as the country with the highest incidence (77.4% of the cases) in the Americas[1]. To deal with dengue outbreaks, authorities focus their efforts on contingency policies. One effective activity for dengue control is insecticide spraying on targeted street blocks. To this end, spraying vehicles are used, due to their high performances. Our work investigates the routing of spraying vehicles, which is formulated as an arc routing problem with covering constraints. Two methodologies are proposed: one grounded on mixed-integer linear programming, and the other on genetic algorithms. Computational experiments were conducted over a set of districts, from the city of Campinas, São Paulo. The results show that the methodologies were effective to find high-quality solutions in reasonable computational times.

References

[1] World Health Organization: Epidemiological update dengue and other arboviruses (2021). https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en/dengue-nacional-en/252-dengue-pais-ano-en.html?start=1. Cited in March 5th 2022.