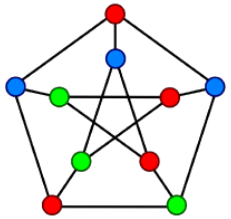


Vehicle Routing Problem with Time Windows

EURO Meets NeurIPS 2022 Vehicle Routing Competition

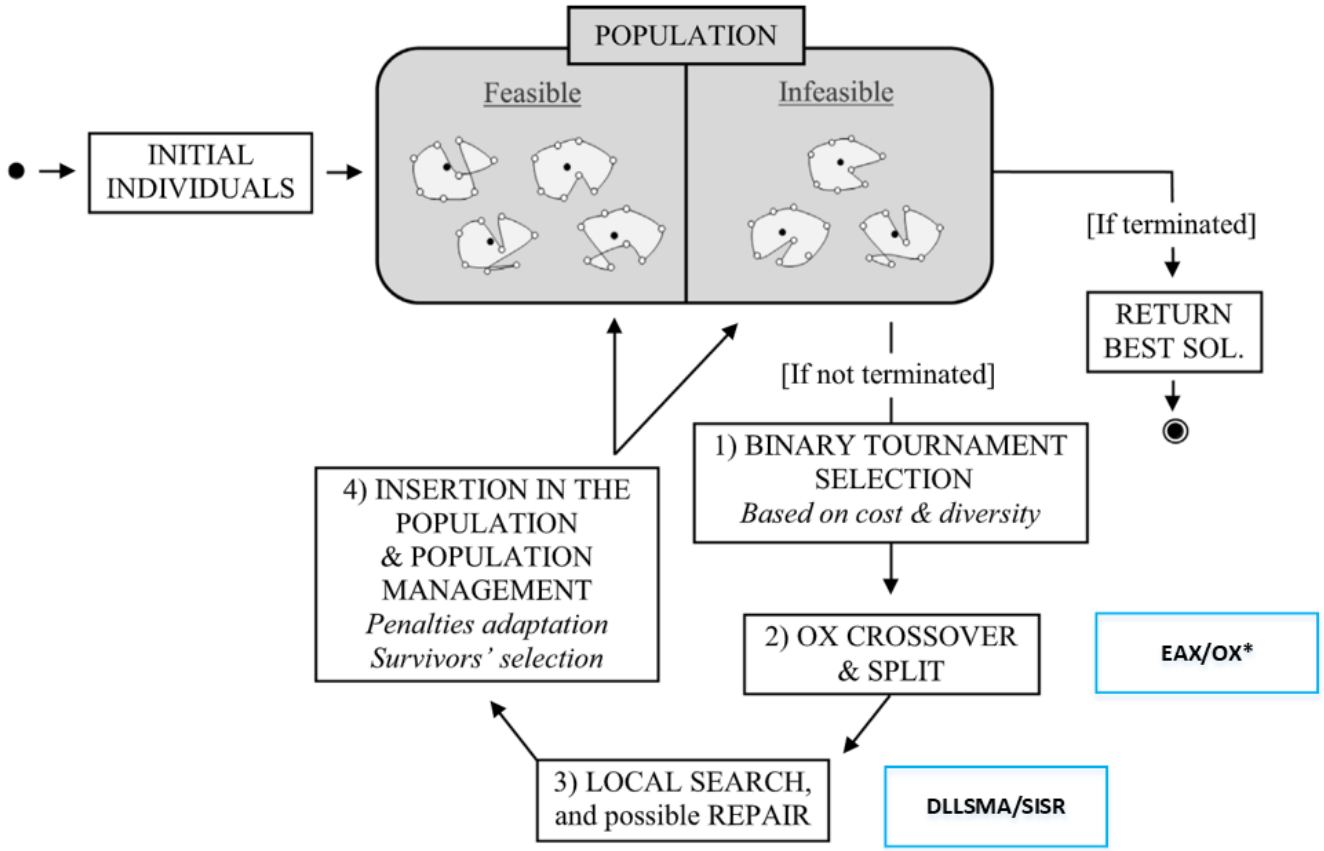
contents

1 Static Variant

2 Dynamic Variant

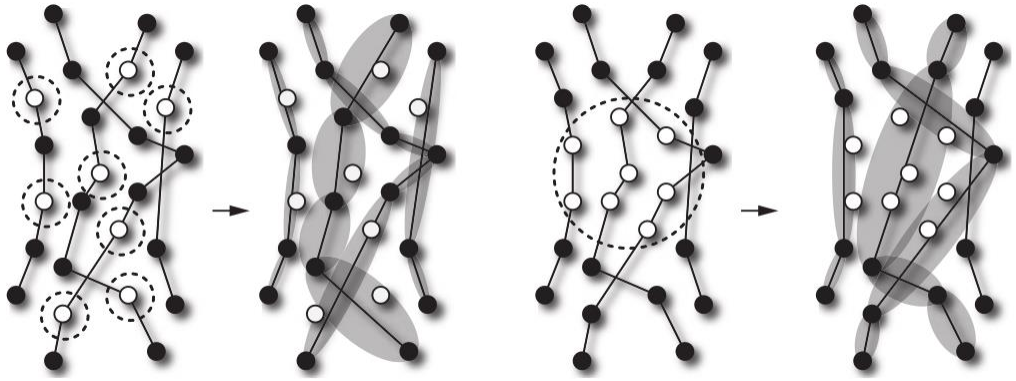
3 Team Member

1 static variant ▶ HGS-OX



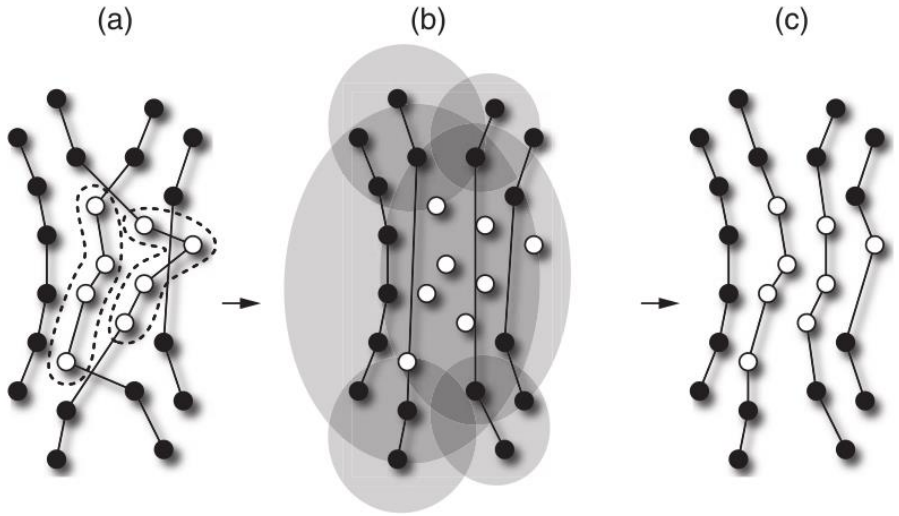
T. Vidal, "Hybrid genetic search for the cvrp: Open-source implementation and swap* neighborhood," Computers & Operations Research, vol. 140, p. 105643, 2022.

VRPTW ▶ SISR



- **randomly selected customers**
- **radially selected customers**

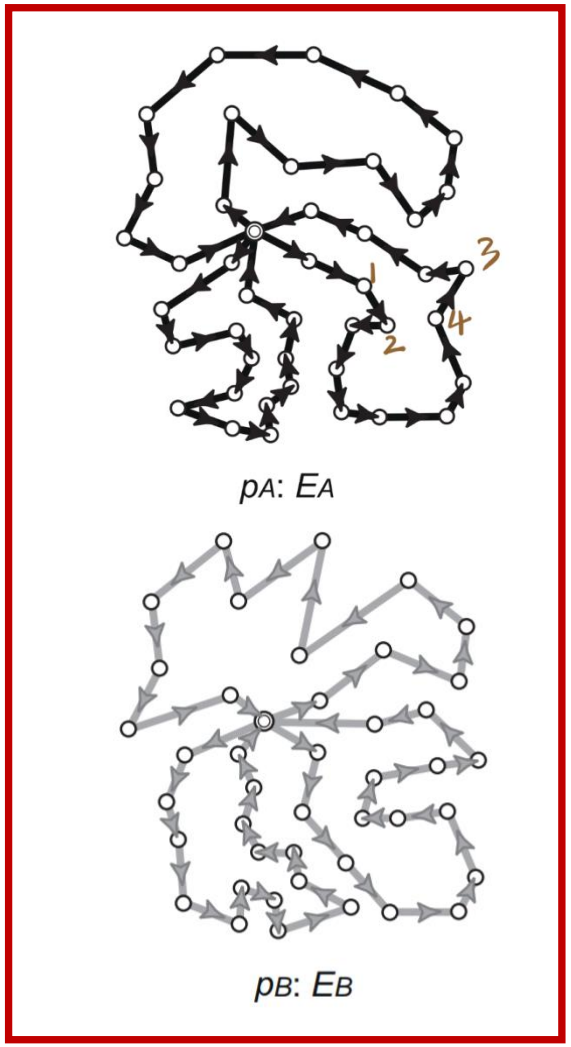
Figure 2. An Example of Adjacent String Removals

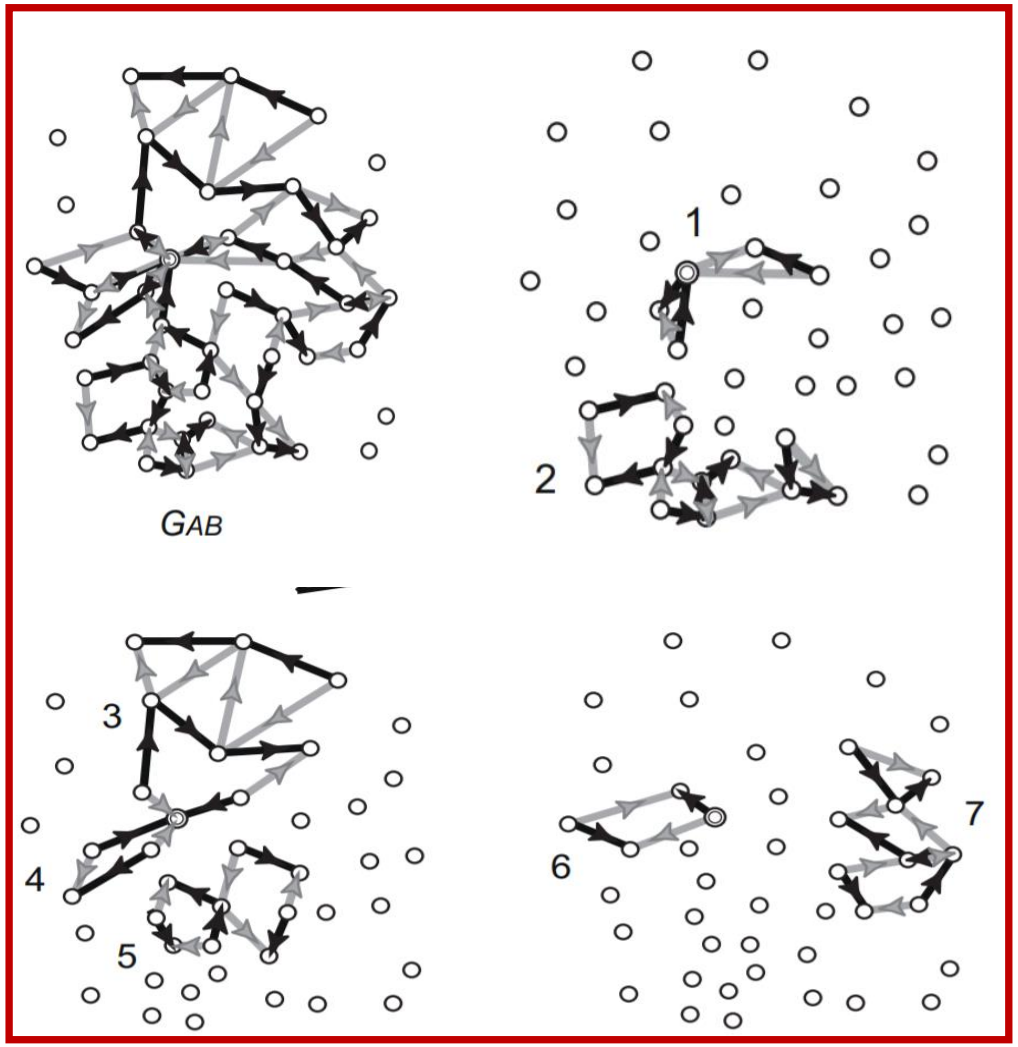


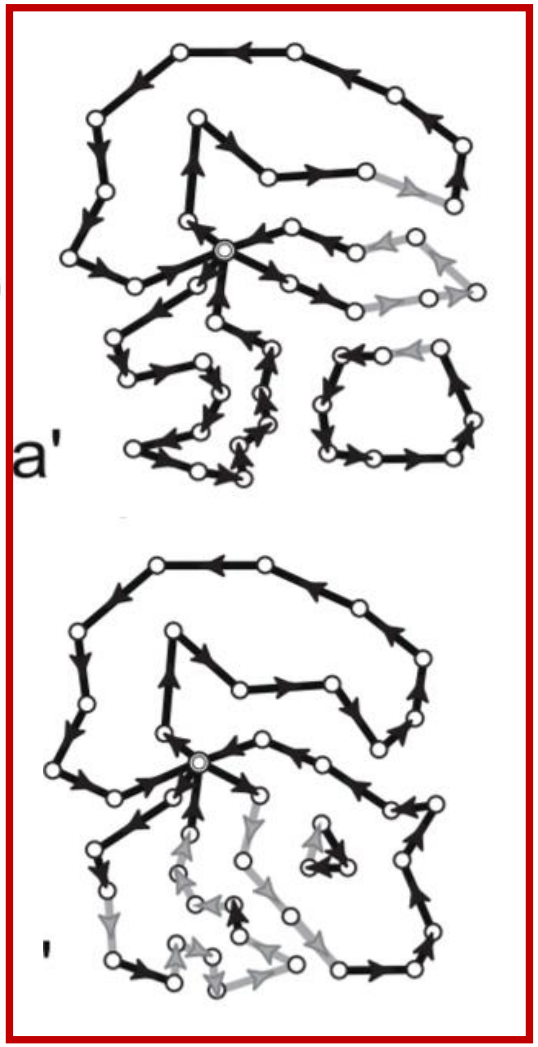
- **Slack Induction by String Removals(SISR)**

J. Christiaens and G. V anden Berghe, "Slack induction by string removals for vehicle routing problems," Transportation Science, vol. 54, no. 2, pp. 417–433, 2020.

VRPTW ▶ EAX

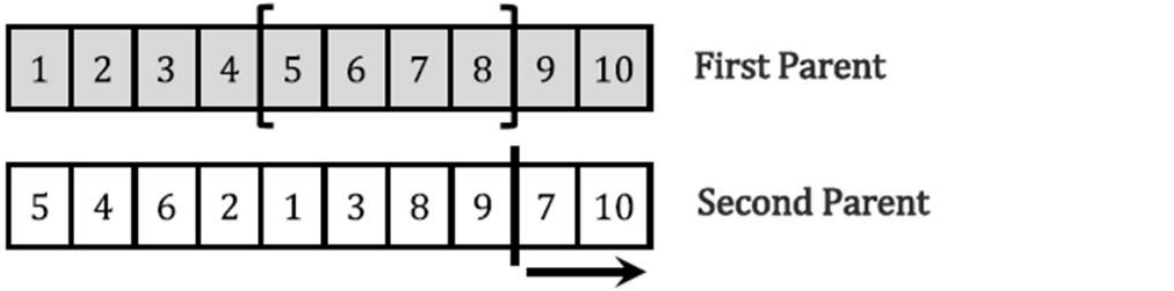






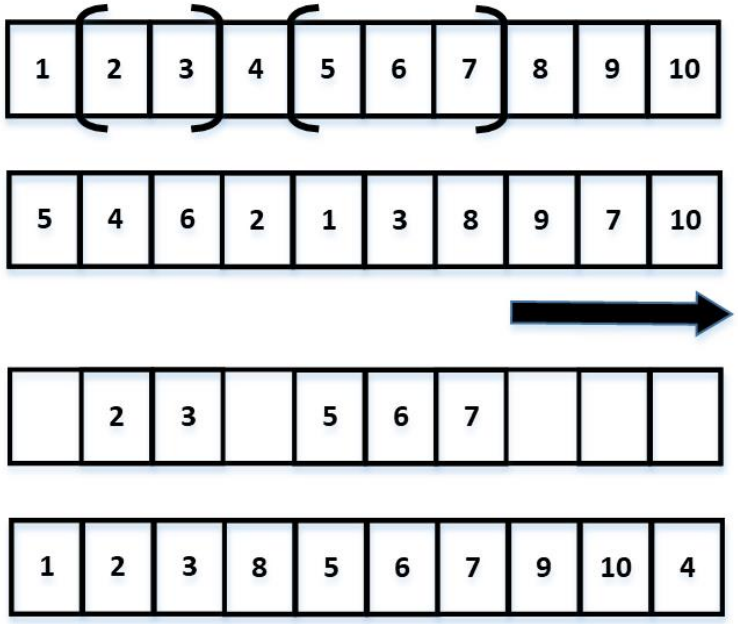
Y . Nagata, O. Bräysy, and W. Dullaert, "A penalty-based edge assembly memetic algorithm for the vehicle routing problem with time windows," Computers & operations research, vol. 37,no. 4, pp. 724–737, 2010..

CVRP ▶ HGS-OX->OX*



Step 1: Select a random fragment of the first parent and inherit it in place

Step 2: Start from the second cutting point and complete circularly with the visits of the second parent



Dynamic Variant ▶ customer penalty

earliest arrival of time window

latest arrival of time window

time window width |latest arrival- earliest arrival|

demand

service duration

duration from depot

Dynamic Variant ▶ customer penalty

- **Calculate penalty**

  The penalty of node *i* can be calculated with its own information.

  $$penalty[i] = a * latestArrival[i] + b * duration[depot, i] + c$$

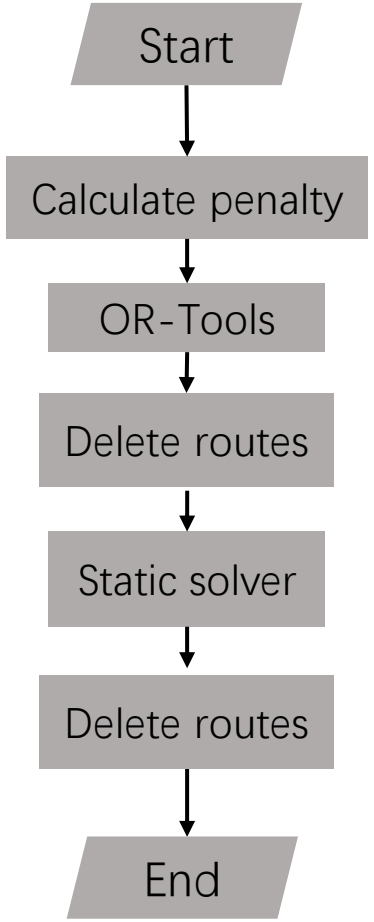
  where *a, b, c* are constants.

- **OR-Tools**

  Input the known information and penalties into OR-Tools, and solve the problem with the method "Penalties and Dropping Visits".

- **Delete routes**

  After we get the solution from the solver, calculate the latest departure time of each route. If it is less than constant *t*, delete that route.



Team Member ▶ HustSmart

- **HustSmart:**

Yunhao Li ∗,Junjie Zhang ∗,Yuxuan Wang ,Wenhan Shao ,Zhouxing Su ,Zhipeng Lü

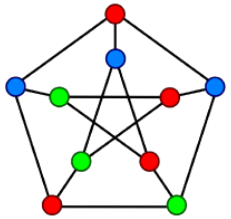
- **Hust**

  Huazhong University of Science and Technology(China)

- **Smart**

  smartlab: http://smart.hust.edu.cn/

3 Team Member ▶ Smart lab



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Thanks!