Path Planning for Long Combination Vehicles

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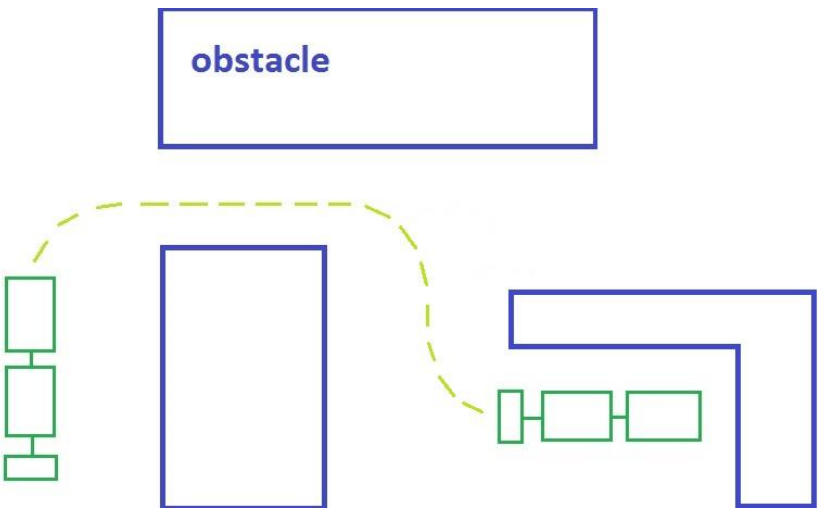
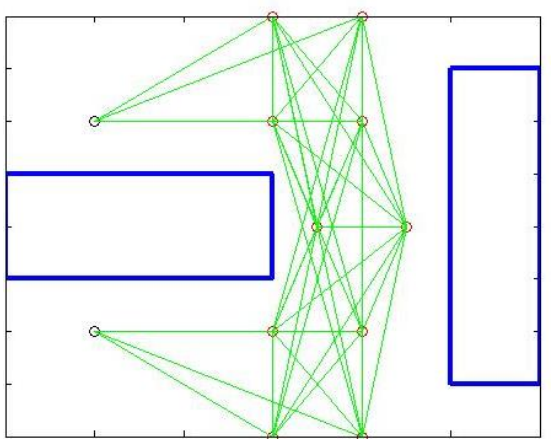
How can we manoeuvre a vehicle such as the one pictured in a yard of obstacles?



Two main challenges:

- Paths that road vehicles can follow are geometrically constrained
- Difficult to pick a collision-free path since the full configuration of the vehicle depends on the whole path, not just its position and heading at a certain time

Getting round obstacles



- Build a graph of line segments that avoid obstacles
- Can put weights on edges and vertices according to how far from obstacles they are
- Find a path from start to finish that minimises this total weight
- Use this as starting point – we have a path made up of separate line segments that we need to transform into a geometrically feasible one

Building a feasible path

- Once we have a basic path made from line segments, can ignore obstacles
- Build a path made up of line segments and arcs that roughly follows this route
- Then need to smooth out the path
- Finally calculate the path that each axle needs to follow

Need to smooth out curvature (e.g. by using sine wave) so that path has continuously differentiable curvature