Trajectory Rollout

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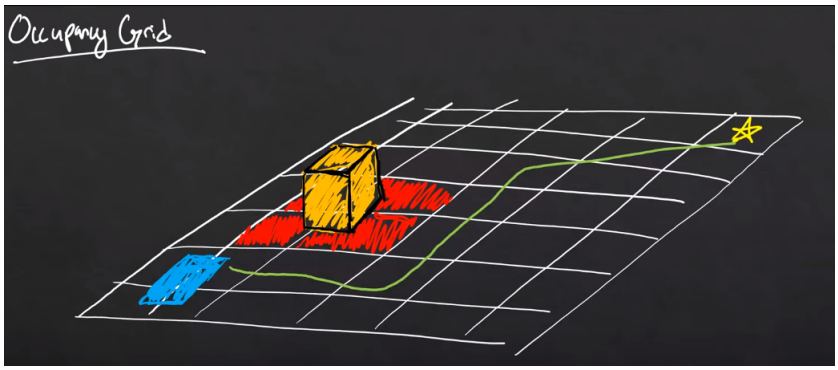
1 Trajectory Rollout

- Similar to feedback control, specifically PID
- Want to pick the most optimal control that we have
- The Problem with the PID is that it may give a control that is outside of the dynamic range of your robot

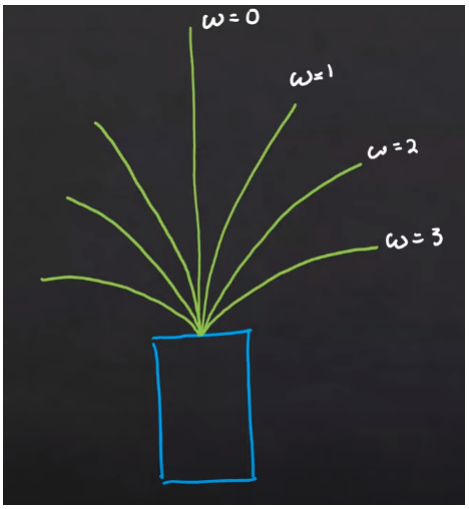
1.1 Occupancy Grid

- A representation of the world, where every cell represents a location in the enviorment
- Put a value in the cell to represent how filled it is in the world
- Can use a laser scanner to detect the obstacles and the ground
- Then robot can decide which cells on the grid are safe to travel on
- Assuming global plan is decided for us (green line)



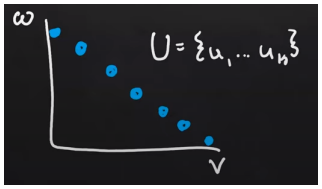
1.2 Algorithm

Each green line is a "rollout"

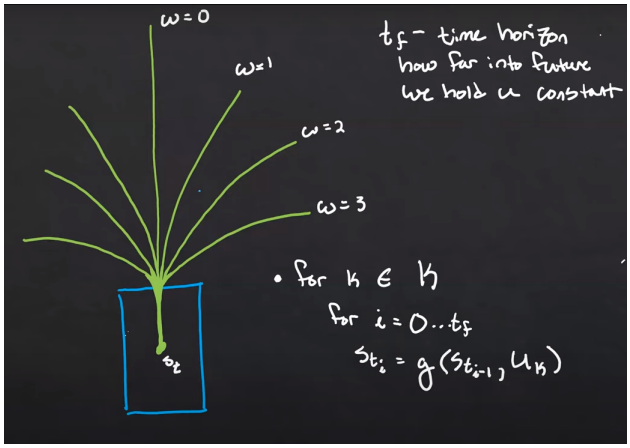


1. Sample k controls from control space where k is the number of rollouts

$$u = \begin{bmatrix} v \\ \omega \end{bmatrix}$$



2. "integrate" it forward
3. Choose which one is the best one



1.2.1 How do we choose?

- Some of the trajectories will interfere with obstacle and some are not close to the Global Plan. So we choose to one closest to the global plan