

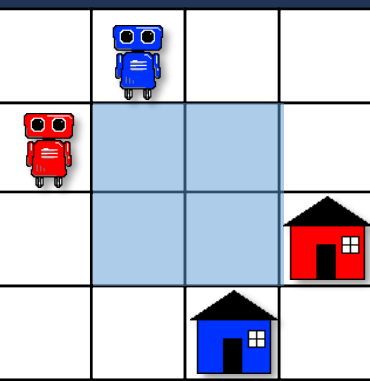
Conflict-Based Increasing Cost Search



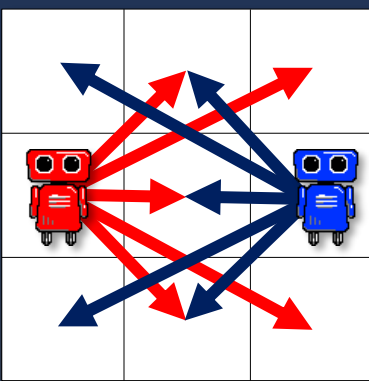
Coordinating Multiple Agents: Challenges

Conflict Symmetries

Spatial Symmetries

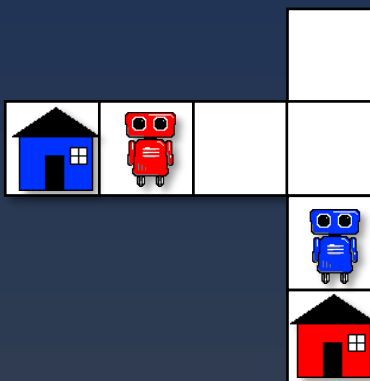


Rectangle Conflict

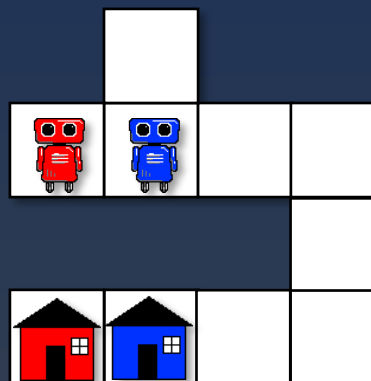


Non-planar Motion Conflict

Temporal Symmetries

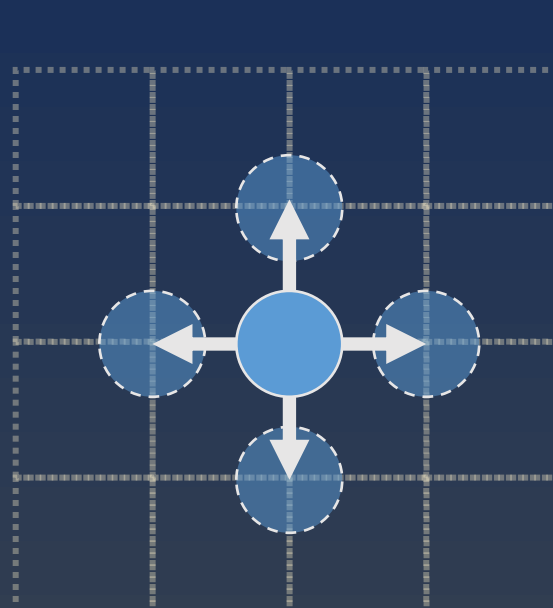


Corridor Conflict

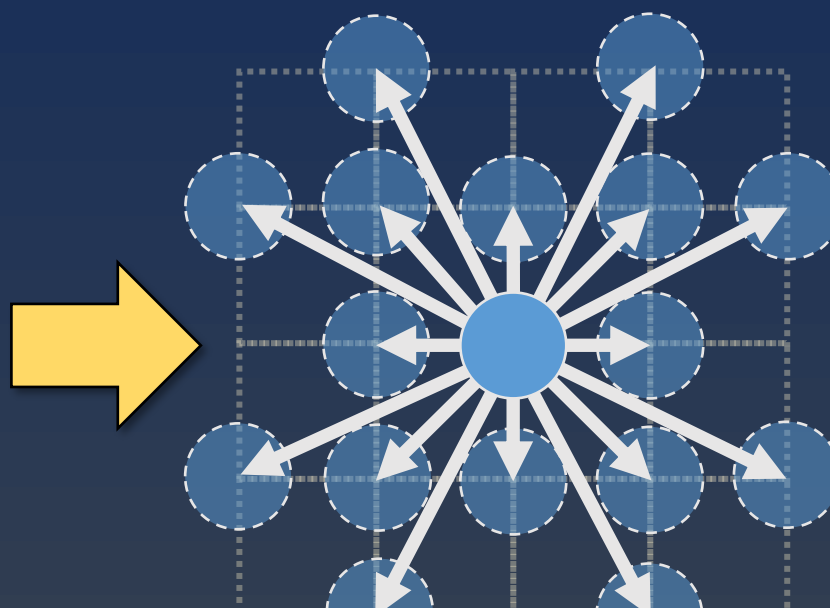


Swapping Conflict

Continuous Time



Unit Edges

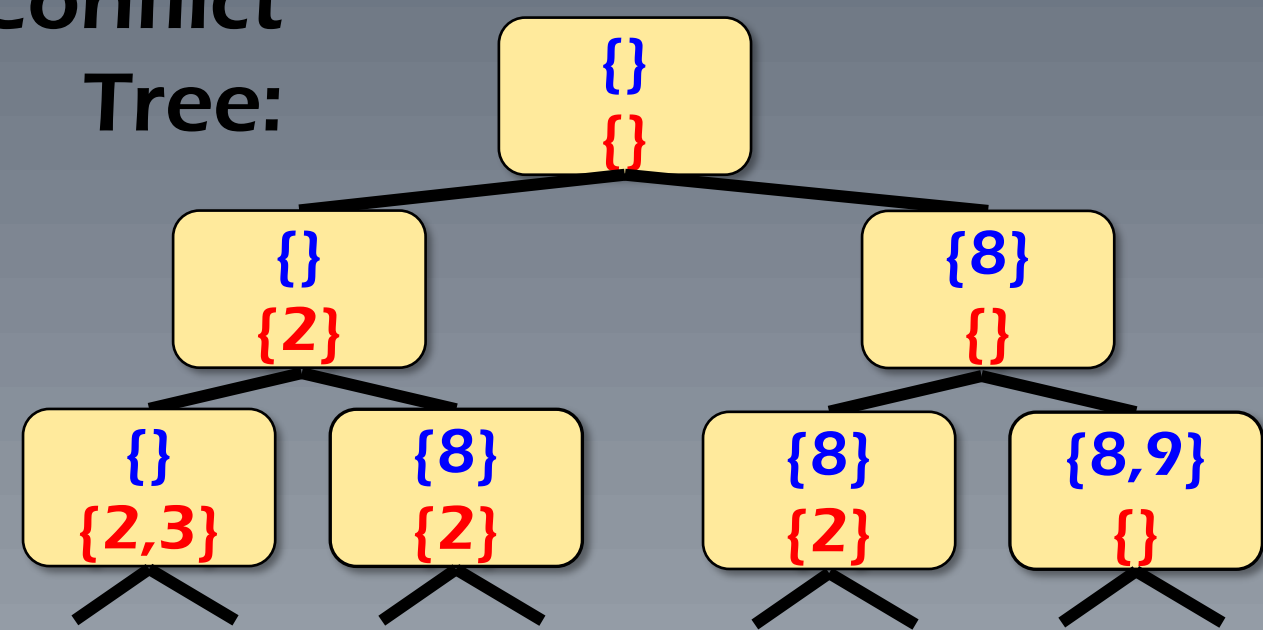


Non-Unit Edges

Merging Two Popular Algorithms

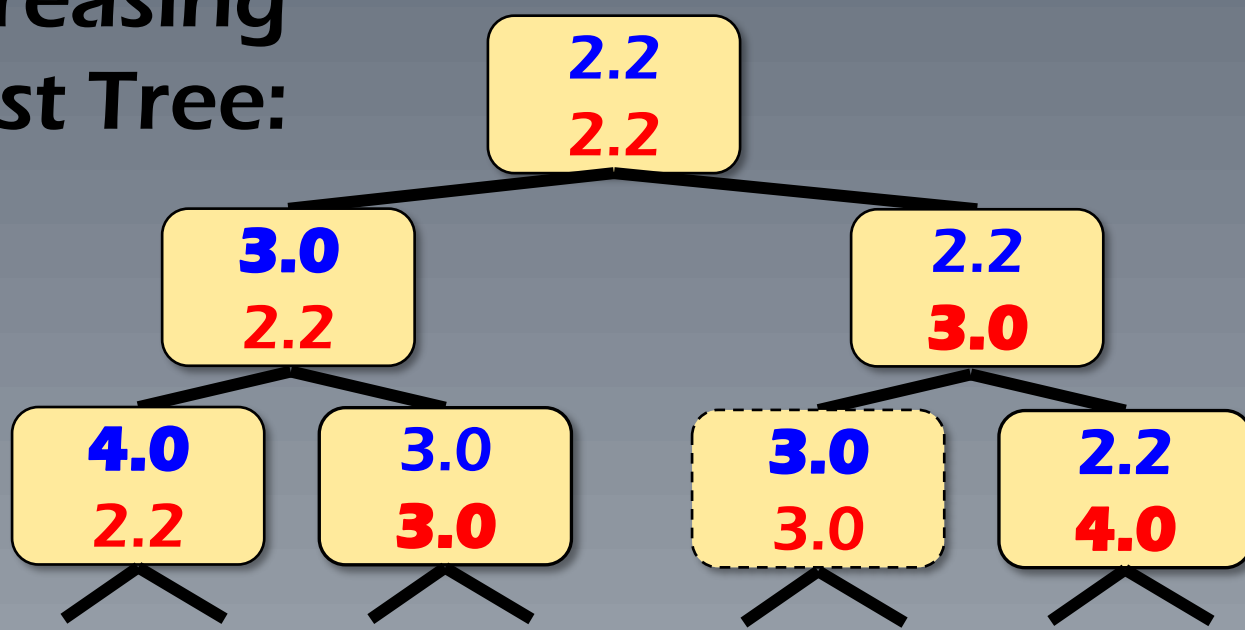
Conflict-Based Search

Conflict Tree:



Increasing Cost Tree Search

Increasing Cost Tree:



Conflict-Based Search (CBS) resolves conflicts by blocking actions using *motion constraints*.

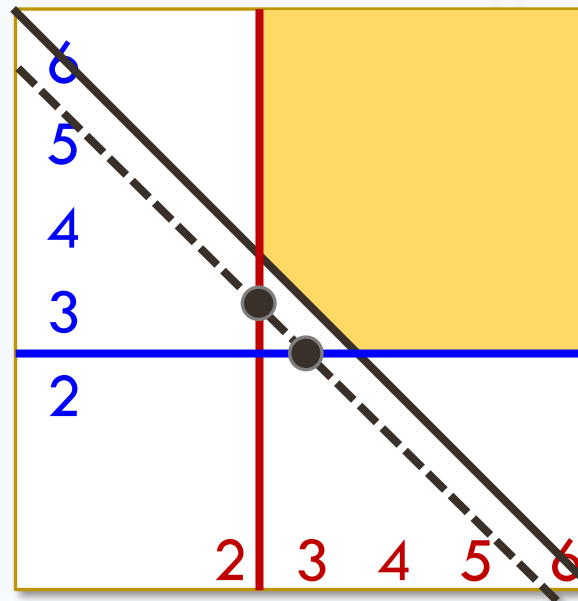
Increasing Cost Tree Search (ICTS) searches for a path *cost vector* representing a feasible solution.

Exploiting Cost and Motion in Context

Continuous Mutex Propagation

CBICS formulates unit-time mutex propagation (Zhang et. al 2020) for continuous time and extends it for generation of cost-conditional *conjunctive constraint sets*.

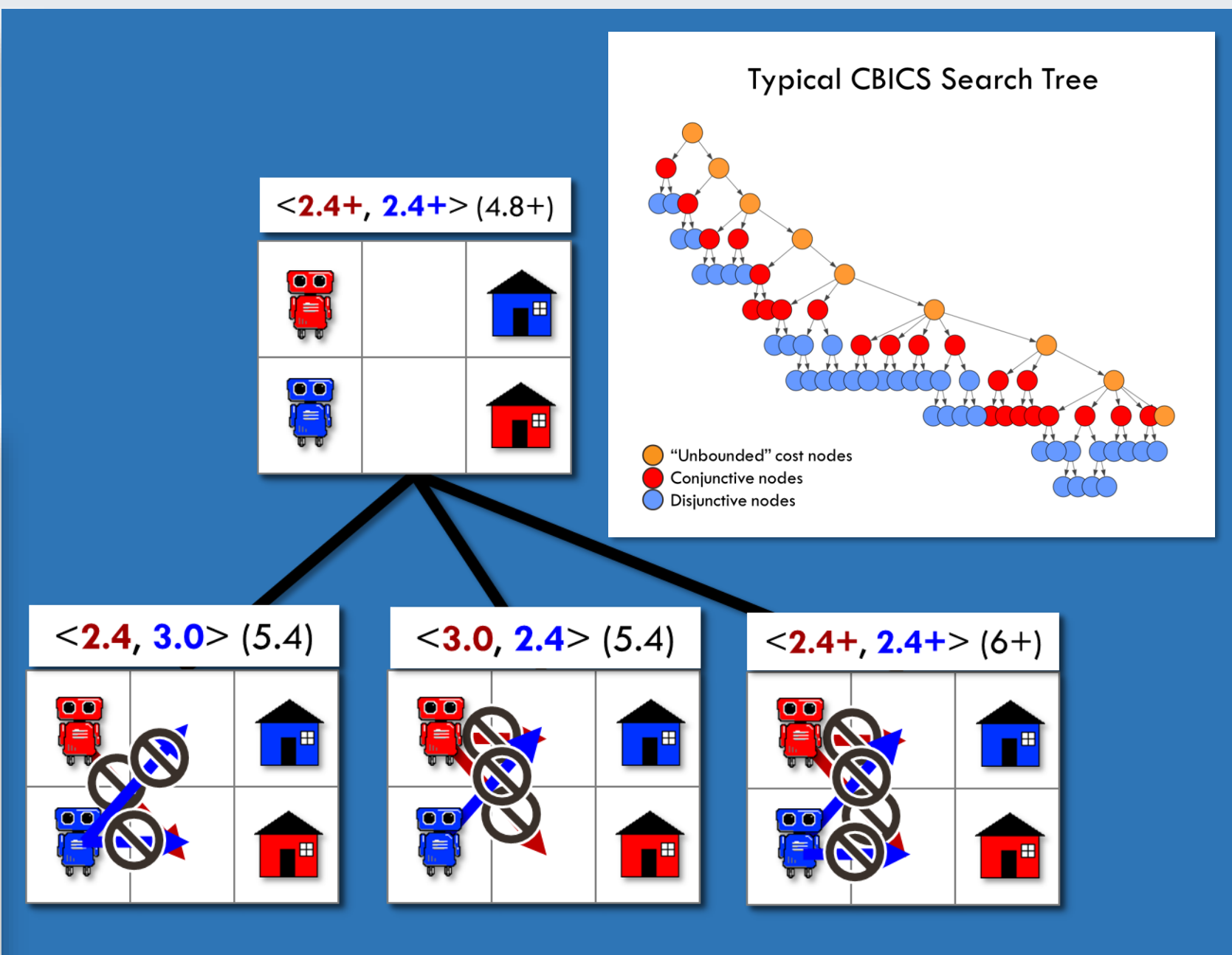
Combined cost space for and .



CBICS reasons about:

- pairwise costs
- motion constraints
- constraint validity in context of cost

Cost-Based Conjunctive Splitting



Empirical Results

