

UniAGENT: Reduced Time-Expansion Graphs and Goal Decomposition in Sub-optimal Cooperative Path Finding

Pavel Surynek

Charles University in Prague
Czech Republic



CPF on Reduced Time Expansion Graphs

- **CPF**

- a group of agents (robots, cars, units in RTS, ...)
- each agent has unique **start** and **goal** location
- **collisions** must be avoided
- environment - undirected graph

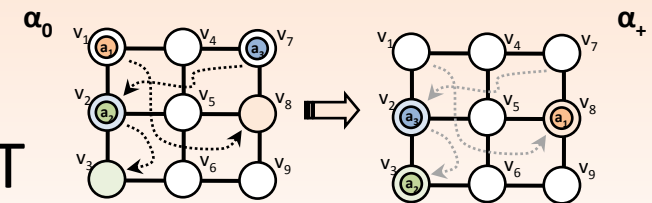
- **Reductions to SAT**

- **expand** graph in time
- model relocation of agents as SAT

- **Reduced expansion and decomposition**

- decompose CPF to single agent placements
- small formulae to be solved

CPF $\Sigma = (G, \{a_1, a_2, a_3\}, \alpha_0, \alpha_+)$



| | α_0 | α_1 | α_2 | α_3 | $\alpha_4 = \alpha_+$ |
|-------|------------|------------|------------|------------|-----------------------|
| a_1 | v_1 | v_1 | v_2 | v_5 | v_8 |
| a_2 | v_2 | v_3 | v_3 | v_3 | v_3 |
| a_3 | v_7 | v_4 | v_4 | v_1 | v_2 |