Focusing Footstep Planning for Humanoids Using Homotopy-Class Guidance

Vinitha Ranganeni, Oren Salzman & Maxim Likhachev
(vrangane, osalzman)@andrew.cmu.edu, maxim@cs.cmu.edu

Planning for Humanoids

Homotopy Classes

\[ \tau_1 \text{ and } \tau_3 \text{ are in the same homotopy class but } \tau_3 \text{ is not because of obstacle } O_1. \]

\[ \text{The signature } s \text{ of path } \gamma \text{ is } r_1r_2r_4^{-1}. \]

Homotopic-Based Heuristic Generation for Footstep Planning

Work To Be Done

- Implementation on Humanoid Robot
- Compare Dijkstra's vs A* in the Homotopic-Based Shortest Path (HBSP) algorithm
- Compare Lazy vs. Eager HBSP
- Compare how path length, size of signature and size of open list affect computation of homotopic-based heuristics

Acknowledgements

Thank you Professor Maxim Likhachev and Oren Salzman for the immense guidance and support and the National Science Foundation for funding me.