

# Resolution-Complete Multi-agent Motion Planning with Arbitrarily-Shaped Obstacles

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**Abstract**—We present a novel algorithm for homogeneous multi-agent motion planning in a continuous workspace with arbitrarily-shaped obstacles. Our approach extracts the medial-axis of the workspace and takes advantage of its geometric characteristics to spatially divide the agents into multiple clusters. For each cluster, we arrange the agents into a circular pattern and compute their movements using a combination of inter-loop and intra-loop movements. In practice, we approximate the medial-axis and using a finite number of boundary samples to show that our planning algorithm is resolution-complete. We highlight its performance on challenging 2D benchmarks and highlight the benefits over prior methods.

**Index Terms**—Multi-agent, resolution-complete, Arbitrarily-Shaped, Medial-Axis.

## I. INTRODUCTION

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## II. CONCLUSION

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## APPENDIX A

### PROOF OF THE FIRST ZONKLAR EQUATION

Appendix one text goes here.

## APPENDIX B

Appendix two text goes here.

## ACKNOWLEDGMENT

The authors would like to thank...

## REFERENCES

- [1] H. Kopka and P. W. Daly, *A Guide to L<sup>A</sup>T<sub>E</sub>X*, 3rd ed. Harlow, England: Addison-Wesley, 1999.