

**DMAA: Reviewer Invitation - The configuration space of a robotic arm over a graph**

1 ข้อความ

**Discrete Mathematics, Algorithms and Applications (DMAA)** <em@editorialmanager.com> 17 ธันวาคม 2564 22:33  
ตอบกลับไปยัง: "Discrete Mathematics, Algorithms and Applications (DMAA)" <dmaa@wspc.com>  
ถึง: Nirutt Pipattanajinda <nirut.p@gmail.com>

Dear Dr. Nirutt Pipattanajinda,

You are kindly invited to review the manuscript DMAA-D-21-00384 entitled "The configuration space of a robotic arm over a graph" which has been submitted to Discrete Mathematics, Algorithms and Applications (DMAA).

This is the abstract:

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We investigate the configuration space  $\mathcal{S}_{\{G,b,\ell\}}$  associated with the movement of a robotic arm of length  $\ell$  on a grid over an underlying graph  $G$ , anchored at a vertex  $b \in G$ . We study an associated PIP (poset with inconsistent pairs)  $\text{IP}_{\{G,b,\ell\}}$  consisting of indexed paths on  $G$ . This PIP acts as a combinatorial model for the robotic arm, and we use  $\text{IP}_{\{G,b,\ell\}}$  to show that the space  $\mathcal{S}_{\{G,b,\ell\}}$  is a CAT(0) cubical complex, generalizing work of Ardila, Bastidas, Ceballos, and Guo. This establishes that geodesics exist within the configuration space, and yields explicit algorithms for moving the robotic arm between different configurations in an optimal fashion. We also give a tight bound on the diameter of the robotic arm transition graph---the maximal number of moves necessary to change from one configuration to another---and compute this diameter for a large family of underlying graphs  $G$ .  
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Kind regards,  
Zhipeng Cai, Ph.D.  
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