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**Motion planning for robots with topological dimension reduction method.** (English)

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**Summary:** This paper explores the realization of robotic motion planning, especially Findpath problem, which is a basic motion planning problem that arises in the development of robotics. Findpath means: Give the initial and desired final configurations of a robotic arm in 3- dimensional space, and give descriptions of the obstacles in the space, determine whether there is a continuous collision-free motion of the robotic arm from one configuration to the other and find such a motion of it exists. There are several branches of approach in motion planning area, but in reality the important things are feasibility, efficiency and accuracy of the method. In this paper according to the concepts of Configuration Space (C-Space) and Rotation Mapping Graph) (RMG), a topological method named Dimension Reduction Method (DRM) for investigating the connectivity of the RMG (or the topologic structure of the RMG) is presented by using topological technique. Based on this approach the Findpath problem is thus transformed to that of finding a connected way in a finite Characteristic Network (CN). The method has shown great potentiality in practice. Here a simulation system is designed to embody DRM and it is in sight that DRM can be adopted in the first overall planning of real robot system in the near future.

**MSC:**

**68U05** Computer graphics; computational geometry (digital and algorithmic aspects)

**68R10** Graph theory (including graph drawing) in computer science

**Keywords:**

Findpath problem; motion planning problem; robotic arm; Configuration Space; Rotation Mapping Graph; Dimension Reduction Method

**Full Text:** [DOI](#)

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