



## On the Combinatorial Complexity of Motion Coordination (Classic Reprint) (Paperback)

By Paul Spirakis

Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.Excerpt from On the Combinatorial Complexity of Motion Coordination We investigate the complexity of the problem of coordinating the motion of many planar rigid objects in a two dimensional space. Each object has a simple geometrical description (it is a box or a circle). The number of objects to be moved is part of the problem size. The plane where objects move is partitioned into two regions: The region of forbidden points, being a finite union of areas each bounded by a polygonal line, and its complement. During motion, objects are not allowed to overlap or to intersect the region of forbidden points, but they are allowed to be in contact with the boundary of obstacles or other objects. We analyze several variants of the above problem of motion planning and prove that they are NP-hard, in the strong sense. We also consider simple combinatorial planar graph-and-pebble models which capture certain non-geometric aspects of coordinated motion. We provide an algorithm for planning the motion of  $k$  pebbles in an  $n$ -vertex planar graph, which is  $O(n)$ . We also...



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