

New Directions in Motion Planning and Control for Ensembles of Mobile Microrobots

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Abstract

Next-generation microscale and nanoscale robotic systems present two key control challenges. First, these systems involve hundreds or millions of robots that have to be steered from one configuration to another. Second, these systems involve actuation mechanisms (e.g., electromagnetic or acoustic fields, optical or chemical gradients, or fluid flow) that apply global inputs to all robots at once. Recent work has begun to address these control challenges. In this talk we will focus in particular on the application of ensemble control theory to motion planning for mobile microrobots. We will present several case studies and explore some new directions for future research.