

Contents

Efficient Multi-robot Motion Planning for Unlabeled Discs in Simple Polygons	1
Aviv Adler, Mark de Berg, Dan Halperin and Kiril Solovey	
Navigation of Distinct Euclidean Particles via Hierarchical Clustering	19
Omur Arslan, Dan P. Guralnik and Daniel E. Koditschek	
Coalition Formation Games for Dynamic Multirobot Tasks.	37
Haluk Bayram and H. Işıl Bozma	
Active Control Strategies for Discovering and Localizing Devices with Range-Only Sensors.	55
Benjamin Charrow, Nathan Michael and Vijay Kumar	
Aggressive Moving Obstacle Avoidance Using a Stochastic Reachable Set Based Potential Field	73
Hao-Tien Chiang, Nick Malone, Kendra Lesser, Meeko Oishi and Lydia Tapia	
Distributed Range-Based Relative Localization of Robot Swarms.	91
Alejandro Cornejo and Radhika Nagpal	
Computing Large Convex Regions of Obstacle-Free Space Through Semidefinite Programming.	109
Robin Deits and Russ Tedrake	
A Region-Based Strategy for Collaborative Roadmap Construction . . .	125
Jory Denny, Read Sandström, Nicole Julian and Nancy M. Amato	

Efficient Sampling-Based Approaches to Optimal Path Planning in Complex Cost Spaces.	143
Didier Devaurs, Thierry Siméon and Juan Cortés	
Real-Time Predictive Modeling and Robust Avoidance of Pedestrians with Uncertain, Changing Intentions	161
Sarah Ferguson, Brandon Luders, Robert C. Grande and Jonathan P. How	
FFRob: An Efficient Heuristic for Task and Motion Planning	179
Caelan Reed Garrett, Tomás Lozano-Pérez and Leslie Pack Kaelbling	
Fast Nearest Neighbor Search in SE(3) for Sampling-Based Motion Planning	197
Jeffrey Ichnowski and Ron Alterovitz	
Trackability with Imprecise Localization	215
Kyle Klein and Subhash Suri	
Kinodynamic RRTs with Fixed Time Step and Best-Input Extension Are Not Probabilistically Complete	233
Tobias Kunz and Mike Stilman	
Featureless Motion Vector-Based Simultaneous Localization, Planar Surface Extraction, and Moving Obstacle Tracking	245
Wen Li and Dezhen Song	
Sparse Methods for Efficient Asymptotically Optimal Kinodynamic Planning.	263
Yanbo Li, Zakary Littlefield and Kostas E. Bekris	
Adaptive Informative Path Planning in Metric Spaces.	283
Zhan Wei Lim, David Hsu and Wee Sun Lee	
The Feasible Transition Graph: Encoding Topology and Manipulation Constraints for Multirobot Push-Planning.	301
Laura Lindzey, Ross A. Knepper, Howie Choset and Siddhartha S. Srinivasa	
Collision Prediction Among Rigid and Articulated Obstacles with Unknown Motion.	319
Yanyan Lu, Zhonghua Xi and Jyh-Ming Lien	

Asymptotically Optimal Stochastic Motion Planning with Temporal Goals	335
Ryan Luna, Morteza Lahijanian, Mark Moll and Lydia E. Kavraki	
Resolution-Exact Algorithms for Link Robots	353
Zhongdi Luo, Yi-Jen Chiang, Jyh-Ming Lien and Chee Yap	
Optimal Trajectories for Planar Rigid Bodies with Switching Costs . . .	371
Yu-Han Lyu and Devin Balkcom	
Maximum-Reward Motion in a Stochastic Environment: The Nonequilibrium Statistical Mechanics Perspective.	389
Fangchang Ma and Sertac Karaman	
Optimal Path Planning in Cooperative Heterogeneous Multi-robot Delivery Systems	407
Neil Mathew, Stephen L. Smith and Steven L. Waslander	
Composing Dynamical Systems to Realize Dynamic Robotic Dancing	425
Shishir Kolathaya, Wen-Loong Ma and Aaron D. Ames	
The Lion and Man Game on Convex Terrains	443
Narges Noori and Volkan Isler	
RRT^X: Real-Time Motion Planning/Replanning for Environments with Unpredictable Obstacles	461
Michael Otte and Emilio Frazzoli	
Orienting Parts with Shape Variation.	479
Fatemeh Panahi, Mansoor Davoodi and A. Frank van der Stappen	
Smooth and Dynamically Stable Navigation of Multiple Human-Like Robots	497
Chonhyon Park and Dinesh Manocha	
Scaling up Gaussian Belief Space Planning Through Covariance-Free Trajectory Optimization and Automatic Differentiation	515
Sachin Patil, Gregory Kahn, Michael Laskey, John Schulman, Ken Goldberg and Pieter Abbeel	

Planning Curvature and Torsion Constrained Ribbons in 3D with Application to Intracavitary Brachytherapy	535
Sachin Patil, Jia Pan, Pieter Abbeel and Ken Goldberg	
A Quadratic Programming Approach to Quasi-Static Whole-Body Manipulation	553
Krishna Shankar, Joel W. Burdick and Nicolas H. Hudson	
On-line Coverage of Planar Environments by a Battery Powered Autonomous Mobile Robot.	571
Iddo Shnaps and Elon Rimon	
Finding a Needle in an Exponential Haystack: Discrete RRT for Exploration of Implicit Roadmaps in Multi-robot Motion Planning	591
Kiril Solovey, Oren Salzman and Dan Halperin	
Stochastic Extended LQR: Optimization-Based Motion Planning Under Uncertainty.	609
Wen Sun, Jur van den Berg and Ron Alterovitz	
An Approximation Algorithm for Time Optimal Multi-Robot Routing.	627
Matthew Turpin, Nathan Michael and Vijay Kumar	
Decidability of Robot Manipulation Planning: Three Disks in the Plane.	641
Marilena Vendittelli, Jean-Paul Laumond and Bud Mishra	
A Topological Perspective on Cycling Robots for Full Tree Coverage.	659
Han Wang, Cheng Chen and Yuliy Baryshnikov	
Towards Arranging and Tightening Knots and Unknots with Fixtures.	677
Weifu Wang, Matthew P. Bell and Devin Balkcom	
Asymptotically Optimal Feedback Planning: FMM Meets Adaptive Mesh Refinement	695
Dmitry S. Yershov and Emilio Frazzoli	
Online Task Planning and Control for Aerial Robots with Fuel Constraints in Winds	711
Chanyeol Yoo, Robert Fitch and Salah Sukkarieh	

**Pebble Motion on Graphs with Rotations: Efficient Feasibility
Tests and Planning Algorithms.** 729
Jingjin Yu and Daniela Rus

Author Index 747

Subject Index 749

Algorithmic Foundations of Robotics XI

Selected Contributions of the Eleventh International
Workshop on the Algorithmic Foundations of Robotics

Akin, H.L.; Amato, N.M.; Isler, V.; van der Stappen, A.F.
(Eds.)

2015, XIX, 751 p. 251 illus., 203 illus. in color.,

Hardcover

ISBN: 978-3-319-16594-3