

Contents

Part I: Networks

Probabilistic Network Formation through Coverage and Freeze-Tag	3
--	----------

Eric Meisner, Wei Yang, Volkan Isler

Planning Aims for a Network of Horizontal and Overhead Sensors	19
---	-----------

Erik Halvorson, Ronald Parr

Mobile Wireless Sensor Network Connectivity Repair with K-Redundancy	35
---	-----------

Nuzhet Atay, Burchan Bayazit

Part II: Distributed Systems

On Endogenous Reconfiguration in Mobile Robotic Networks	53
---	-----------

Ketan Savla, Emilio Frazzoli

Simultaneous Control of Multiple MEMS Microrobots	69
--	-----------

Bruce R. Donald, Christopher G. Levey, Igor Paprotny, Daniela Rus

Simultaneous Coverage and Tracking (SCAT) of Moving Targets with Robot Networks	85
--	-----------

*Luciano C.A. Pimenta, Mac Schwager, Quentin Lindsey, Vijay Kumar,
Daniela Rus, Renato C. Mesquita, Guilherme A.S. Pereira*

Cooperative Towing with Multiple Robots	101
--	------------

Peng Cheng, Jonathan Fink, Soonkyum Kim, Vijay Kumar

Part III: Manipulation

Two Finger Caging: Squeezing and Stretching	119
--	------------

Alberto Rodriguez, Matthew T. Mason

A State Transition Diagram for Simultaneous Collisions with Application in Billiard Shooting	135
<i>Yan-Bin Jia, Matthew Mason, Michael Erdmann</i>	

A Variational Approach to Strand-Based Modeling of the Human Hand	151
<i>Elliot R. Johnson, Karen Morris, Todd D. Murphey</i>	

A Stopping Algorithm for Mechanical Systems	167
<i>Jason Nightingale, Richard Hind, Bill Goodwine</i>	

Part IV: Robust Planning

Perceived CT-Space for Motion Planning in Unknown and Unpredictable Environments	183
<i>Rayomand Vatcha, Jing Xiao</i>	

Bounded Uncertainty Roadmaps for Path Planning	199
<i>Leonidas J. Guibas, David Hsu, Hanna Kurniawati, Ehsan Rehman</i>	

A Sampling Hyperbelief Optimization Technique for Stochastic Systems	217
<i>James C. Davidson, Seth A. Hutchinson</i>	

Part V: Computational Minimalism

On the Value of Ignorance: Balancing Tracking and Privacy Using a Two-Bit Sensor	235
<i>Jason M. O'Kane</i>	

On the Existence of Nash Equilibrium for a Two Player Pursuit-Evasion Game with Visibility Constraints	251
<i>Sourabh Bhattacharya, Seth Hutchinson</i>	

On the Topology of Plans	267
<i>Michael Erdmann</i>	

Part VI: Geometric Sensing

Mirror-Based Extrinsic Camera Calibration	285
<i>Joel A. Hesch, Anastasios I. Mourikis, Stergios I. Roumeliotis</i>	

On the Analysis of the Depth Error on the Road Plane for Monocular Vision-Based Robot Navigation	301
<i>Dezhen Song, Hyunnam Lee, Jingang Yi</i>	

Sensor Beams, Obstacles, and Possible Paths	317
<i>Benjamin Tovar, Fred Cohen, Steven M. LaValle</i>	

A Motion Planner for Maintaining Landmark Visibility with a Differential Drive Robot	333
<i>Jean-Bernard Hayet, Claudia Esteves, Rafael Murrieta-Cid</i>	

Part VII: Geometric Computations

On Approximate Geodesic-Distance Queries amid Deforming Point Clouds	351
<i>Pankaj K. Agarwal, Alon Efrat, R. Sharathkumar, Hai Yu</i>	

Constrained Motion Interpolation with Distance Constraints	367
<i>Liangjun Zhang, Dinesh Manocha</i>	

Generating Uniform Incremental Grids on $SO(3)$ Using the Hopf Fibration	385
<i>Anna Yershova, Steven M. LaValle, Julie C. Mitchell</i>	

A Simple Method for Computing Minkowski Sum Boundary in 3D Using Collision Detection	401
<i>Jyh-Ming Lien</i>	

Polyhedral Assembly Partitioning with Infinite Translations or <i>The Importance of Being Exact</i>	417
<i>Efi Fogel, Dan Halperin</i>	

Realistic Reconfiguration of Crystalline (and Telecube) Robots	433
<i>Greg Aloupis, Sébastien Collette, Mirela Damian, Erik D. Demaine, Dania El-Khechen, Robin Flatland, Stefan Langerman, Joseph O'Rourke, Val Pinciu, Suneeta Ramaswami, Vera Sacristán, Stefanie Wuhrer</i>	

Kinodynamic Motion Planning by Interior-Exterior Cell Exploration ...	449
<i>Ioan A. Șucan, Lydia E. Kavraki</i>	

Part VIII: Stochastic Methods in Planning

Control of Probabilistic Diffusion in Motion Planning	467
<i>Sébastien Dalibard, Jean-Paul Laumond</i>	

Stochastic Motion Planning and Applications to Traffic	483
<i>Sejoon Lim, Hari Balakrishnan, David Gifford, Samuel Madden, Daniela Rus</i>	

On Probabilistic Search Decisions under Searcher Motion Constraints	501
<i>Timothy H. Chung</i>	
Planning with Reachable Distances	517
<i>Xinyu Tang, Shawna Thomas, Nancy M. Amato</i>	

Part IX: Medical Applications

3D Motion Planning Algorithms for Steerable Needles Using Inverse Kinematics	535
<i>Vincent Duindam, Jijie Xu, Ron Alterovitz, Shankar Sastry, Ken Goldberg</i>	
Modeling Structural Heterogeneity in Proteins from X-Ray Data	551
<i>Ankur Dhanik, Henry van den Bedem, Ashley Deacon, Jean Claude Latombe</i>	
Minimum Resource Characterization of Biochemical Analyses for Digital Microfluidic Biochip Design	567
<i>Lingzhi Luo, Srinivas Akella</i>	
Path Planning for Flexible Needles Using Second Order Error Propagation	583
<i>Wooram Park, Yunfeng Wang, Gregory S. Chirikjian</i>	

Part X: Planning

Path Planning among Movable Obstacles: A Probabilistically Complete Approach	599
<i>Jur van den Berg, Mike Stilman, James Kuffner, Ming Lin, Dinesh Manocha</i>	
Multi-modal Motion Planning in Non-expansive Spaces	615
<i>Kris Hauser, Jean-Claude Latombe</i>	
Toward SLAM on Graphs	631
<i>Avik De, Jusuk Lee, Nicholas Keller, Noah J. Cowan</i>	
HybridSLAM: Combining FastSLAM and EKF-SLAM for Reliable Mapping	647
<i>Alex Brooks, Tim Bailey</i>	
Discovering a Point Source in Unknown Environments	663
<i>Martin Burger, Yanina Landa, Nicolay M. Tanushev, Richard Tsai</i>	
Author Index	679