

Advanced Topics in Computer Science - On Multi-A(ge)nt Systems

סמינריון מחקר בקומבינטוריקה ותורת הגרפים - 236824 סמסטר: חורף תשפ"א

מרצה:	פרופ' פרדי ברוקשטיין
שעות הרצאה:	16:30-14:30 – יום א'
שעת תרגול:	
דרישות קדם:	
אתר הקורס:	

תאור הקורס

The course presents a series of topics in multi agent robotic systems ,with special emphasis on the mathematics employed in their analysis.

Part 1: Happy Pursuits

Pursuit as a Model for Inter-agent Interaction.

Cyclic Pursuits

Chain Pursuits: why the Ant Trails look so straight and nice

Pursuit in Discrete Time and Graph Environments

Part 2: Come Together

Geometric gathering of Identical Agents

Discrete and Continuous Dynamic Agent Models

Agents with Unlimited or Limited Visibility Sensing

Agents with Relative Location or Direction Only Sensing

Part 3: The Power of Odors

Models of Pheromone Based Collaboration

Covering and Patrol Algorithms

Rotor Routers and Graph Partitioning-based Coverage

Oblivious Cooperative Cleaners

Stationary and Dynamic Environments

Part 4: Swarm Control

Gradient Climbing with Oblivious and Local Sensing Agents

Broadcast Control of Swarms
Leaders and Followers
Agents with and Without Compasses

Part 5: Self-Location and Mapping

Agents with Crude Odometric Self Location
Encounter Based Error Reduction
Joint Environment Mapping and Self Location

Part 6: In Sync via Local Interaction

Theories of Oscillator Synchronization
Synchronization with Stationary Interaction Graphs
Dynamic and Location Based Interactions
Synchronized Motion

Part 7: Unicycles and Physical Particles

Complex Agent Motions and their Consequences
Discretized vs Continuous Evolutions
Interactions by Potential Fields