

Lab 5

# Threshold- and Market-based Algorithms

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# Content

- Task Allocation
  - Threshold-based Algorithms
  - Market-based Algorithms
- Case Study: “Event Handling”
  - Robots, Events in environment
  - Problem: assigning robots to handle events (tasks)

# Threshold-based Algorithms

- Stimulus  $\rightarrow$  Response  
(sensors  $\rightarrow$  actuators)
- Adaptive thresholds

# Market-based Algorithms (1)

- Economics:
  - Robots negotiate over events
  - To find a ‘cost-effective’ solution
- Requires:
  - Communication
  - Planning
  - Etc...

# Market-based Algorithms (2)

- Auctions
  - Centralized (can be partially distributed)
- Bidding
  - A robot determines the cost & benefit of performing a task
  - Local objective function
    - The robot with the best offer wins (is assigned)
  - Global objective function
- What factors influence how a robot bids?