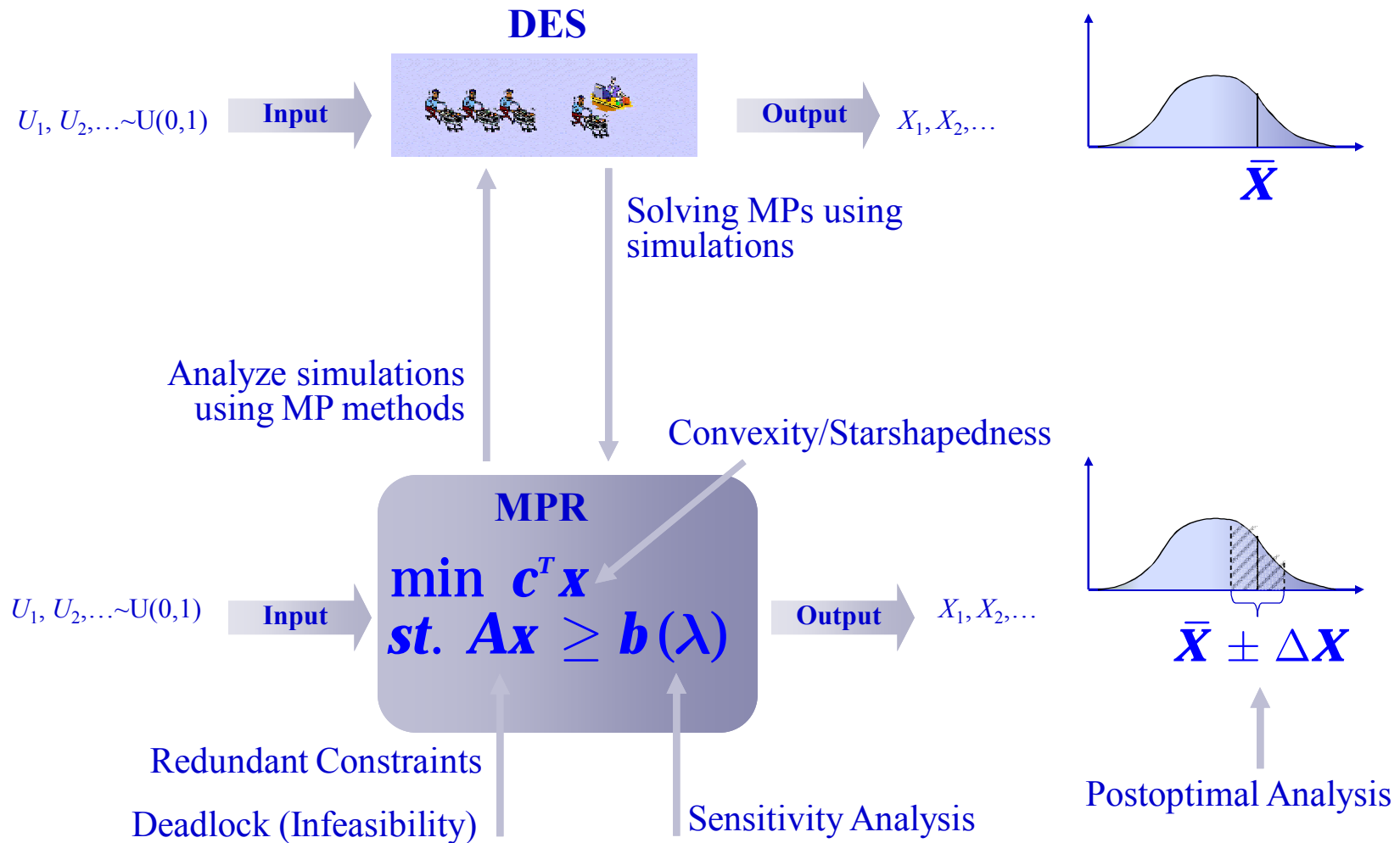


Research Topics:

- Discrete-Event Simulation Optimization
 - Mathematical Programming Representations (MPR)
- Agent-based Simulation Optimization
 - Energy Markets
 - Social Networks
 - Evacuation



Mathematical Programming Representations of DES

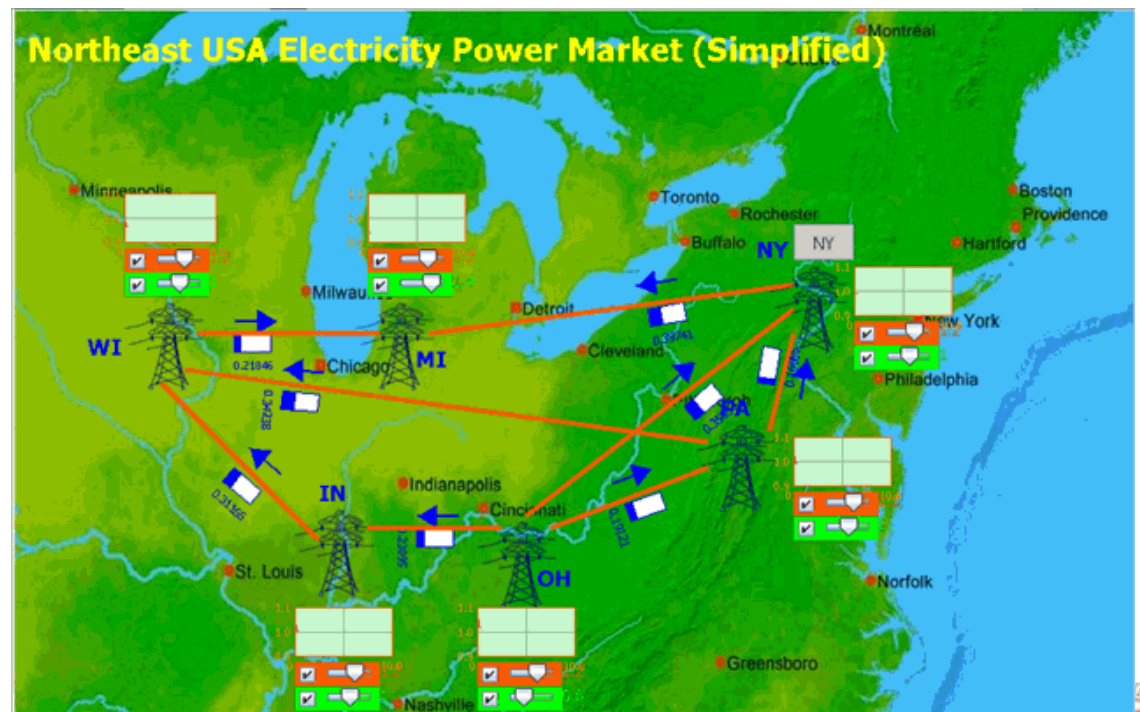


Intelligent Agents Simulator

- Simulate bidding behaviors of generation companies under the following scenarios:
 - ∅ Different market structures: monopoly, duopoly, & perfect competition.
 - ∅ Dual objectives: maximizing profit and reaching targeted market share.
 - ∅ Portfolios: identified conditions for collaborations of multiple generators.

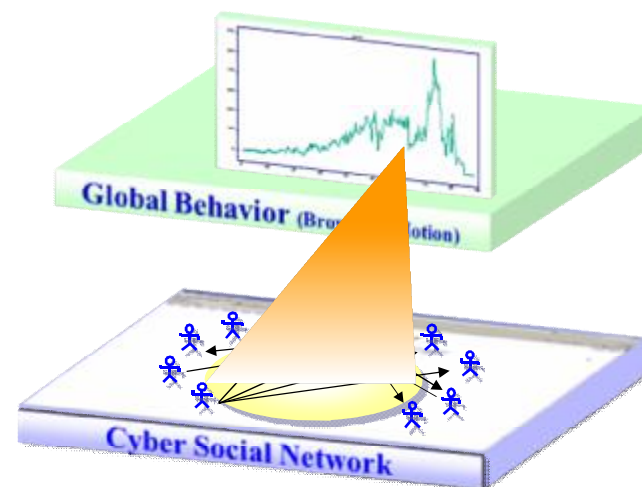
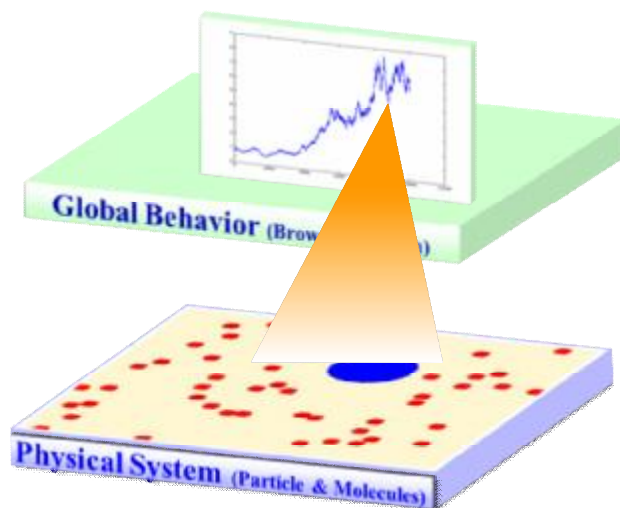
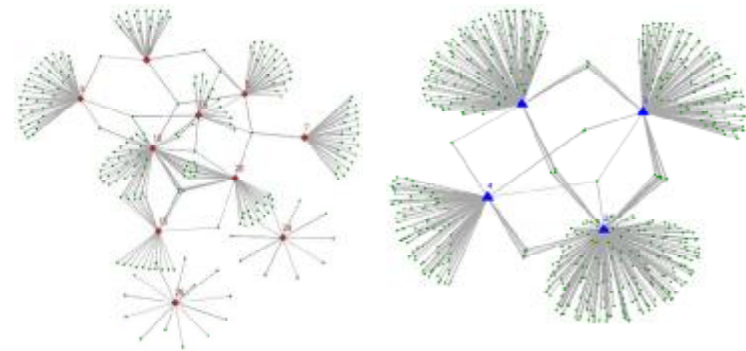
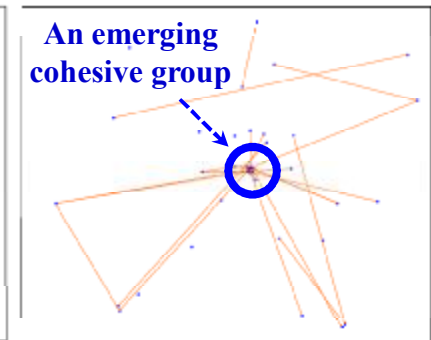
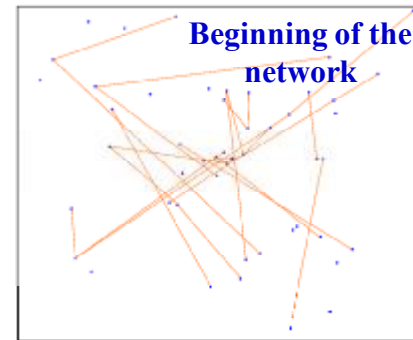
- Challenge:

- ∅ Large number of market participants.
- ∅ Realistic agent learning capability.
- ∅ Mining large amount of data.



Cyber Social Networks

- Chang point detection
- Abnormal event detection
- Situation awareness
- Key members identification



Questions?

- What are we optimizing?
- What is “large-scale”? What is “complex”?
- How to handle interactions across systems/components in a complex system?
- What if the interacting systems/components are intelligent and adaptively change their behavior?
- Can existing simulation-optimization techniques be used in “optimizing” human systems?

