Synthesis for Robotics

Hadas Kress-Gazit
Cornell University
Synthesizing Robot Controllers

• Physical:
  – Dynamics
  – Optimality
  – Robustness

• Working around humans
  – Dynamic environments
  – Feedback

• Multi robot systems, swarms
Highlights

• Collaborations:
  – Rice – Cornell (HSCC paper, workshop at RSS 2013)
  – Cornell – UCLA (paper under review)
  – Berkeley – Cornell (VMCAI paper)
  – Berkeley – Penn (paper under review)
  – UCLA – Rice (visits by Morteza, Ayca)
  – Michigan – Berkeley (benchmark for the synthesis competition)
  – …
Highlights

• PI meeting at Rice, November 2013:
  – Tool tutorials (OMPL, LTLMoP, Pessoa)
  – Discussion groups around different topics
  – Outcomes:
    • Planned Joint paper (Cornell, Rice, UCLA)
    • Benchmark for synthesis competition
    • Identified collaboration topics
How can we

• Synthesize low-level control?
  – Can SMT play a role?
  – How do we deal with the inherent feedback (not quite suitable for the SyGuS format)

• Scale reactive synthesis?