Synthesizing Infinite-state Reactive Systems
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- Reactive Systems: Always safe against unpredictable environment
- Realizability: “Does an implementation exist for my spec?”
- Synthesis: “Generate a witness!”
- Boolean spec: Polynomial time for General Reactivity (1)! 😊

- But, we (always) want more...
  - “What if my spec admits infinite theories?”
  - $x > 0 \Rightarrow -3y \leq 3.85$
  - “While the button is pressed, the infusion pump shall deliver no more than 0.2mg above the standard dosage”
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• Infinite-state reactive system synthesis with JKind
  • Formal Verification techniques for infinite-state synthesis
  • K-Induction
  • Greatest fixpoints

• Future Work: Witnesses simulating nondeterministic behavior!

• “Why?...”
  • Robot motion planning (Controllers with random, difficult to learn strategies)
  • Model-based Fuzz Testing (Synthesized fuzzers reactive to the system-under test)
  • ...possibly even more!

• Want to learn more? Poster session!