Synchronization, Road Coloring, and Jumps in Finite Automata

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known machine without output, unknown state

known machine without output, KNOWN state

Formal models of machines:

Simple
- deterministic finite automata (DFA)
- partial finite automata
- DFA with specified uncertainty

Complex
- timed automata
- weighted automata
- others

BAD NEWS:
- In some simple models, shortest reset words may be exponential in number of states
- Even for heavily restricted DFA, it is NP-hard to find short reset words
- Some NP-hard problems lie in FPT, but do not admit polynomial kernels

Publications:
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The models describe programs, circuits, moving objects, or other systems