

Synchronization, Road Coloring, and Jumps in Finite Automata

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known machine without output,
unknown state

synchronizing input



(reset word)



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

*The models describe
programs, circuits,
moving objects, or
other systems*

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:

Subset Synchronization of

Vojtěch Vo
Charles University in Pragu

Parameter
and Road

Discrete Mathematics and Theoretical Computer Science

Complexity of a F
Words for Euler

DMTCS vol. 17:1, 2015, 309

Complexity of Road Coloring
with Prescribed Reset Words

(5) and Adam Roman²