FOUNDATIONS OF MATHEMATICS, LECTURE 8

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BMETE91AM35 Fall 2023-24

Moore automata and regular languages

- Distinction between recognizer, acceptor, transducer, and generator
- Distinction between deterministic and nondeterministic machine
- Distinction between probabilistic and nondeterministic
- Regular expressions
- Regular language $\Leftrightarrow$ can be described by regexp
- Can be described by regexp $\Leftrightarrow$ can be accepted by FA
- Examples of non-regular languages

REGULAR EXPRESSIONS

- Concatenation, alternation, Kleene * (and complementation)
- Input the string letter by letter
- Watch if it's in an accepting state at the end
- Every finite automaton determines a language
- The converse is not true: there exist languages for which no finite automaton works
- We call those languages that can be determined by a FA *regular*

HOMEWORK

- HW8.1 Prove that for every finite automaton A there is a regular expression R that determines the same language
- HW8.2 Given k consecutive integers, when is their sum divisible by k?
- HW8.3 Solve the equation $7^a + 7^b + 2^c = n!$ for all $a, b, c, n \geq 0$