Kleene Algebra With Tests and Applications to Network Programming

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Abstract. We will introduce Kleene algebra with tests, a language based on regular expressions that can be used to reason about simple imperative programs. We will then present NetKAT, a language for programming networks based on Kleene Algebra with Tests, and discuss several examples of network properties that can be specified and proved with NetKAT. We will review operational, denotational, and axiomatic semantics in the context of NetKAT and present an equivalence procedure based on coalgebraic techniques. Time permitting, we will also discuss a probabilistic extension of the language and its semantics.