Interpretation of Two-Way Pushdown Automata Revisited

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We revisit a result from theoretical computer science from a programming perspective. Cook's theorem (1972) showed that two-way deterministic pushdown automata (2DPDA) can be interpreted faster (in linear time) than they run (in exponential time).

The essence of this result is explained using a semantics-based approach: we give a recursive interpreter which, when extended with random-access memory, performs a linear-time interpretation of 2DPDA. The construction is then extended to non-deterministic pushdown automata yielding a polynomial-time interpretation. The simple programming approach may provide an alternative to look at some program transformation and complexity problems.