Array Theory of Bounded Elements and its Applications

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Abstract We investigate a first-order array theory of bounded elements. This theory has rich expressive power that allows free use of quantifiers. By reducing to weak second-order logic with one successor (WS1S), we show that the proposed array theory is decidable. Then two natural extensions to the new theory are shown to be undecidable. A translation-based decision procedure for this theory is implemented, and is shown applicable to program verification.

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