

# IMPLEMENTATION AND VERIFICATION OF RING TERMINATION DETECTION PROTOCOLS USING STRUCTURED RV-PROGRAMS

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## Abstract

A model (consisting of *rv-systems*), a core programming language (for developing *rv-programs*), several specification and analysis techniques appropriate for modeling, programming and reasoning about interactive computing systems have been introduced by Stefanescu in 2004 using register machines and space-time duality, see [8]. In a couple of papers [3, 4] the authors have introduced structured programming techniques for *rv-systems* and have developed a Hoare-like verification logic.

The dual-pass ring termination detection protocol is used to detect the termination of a pool of processes, logically organized into a ring. In this paper we develop an implementation for the core activity of the processes and for their interactions using structured *rv-programs*. Then, we present a formal proof of the correctness of the protocol using our Hoare-like logic for structured *rv-programs*. A brief study of variations of the protocol is included, as well.

**Keywords:** ring termination detection, structured *rv-systems*, formal verification, Hoare logic, interactive systems, registers and voices.

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