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An efficient optimistic time management algorithm for discrete-eventsimulation system

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Abstract

Time Wrap algorithm is a well-known mechanism of optimistic synchronization in a parallel discrete-event simulation (PDES) system. It offers a run time recovery mechanism that deals with the causality errors. For an efficient use of rollback, the global virtual time (GVT) computation is performed to reclaim the memory, commit the output, detect the termination, and handle the errors. This paper presents a new unacknowledged message list (UML) scheme for an efficient and accurate GVT computation. The proposed UML scheme is based on the assumption that certain variables are accessible by all processors. In addition to GVT computation, the proposed UML scheme provides an effective solution for both simultaneous reporting and transient message problems in the context of synchronous algorithm. To support the proposed UML approach, two algorithms are presented in details, with a proof of its correctness. Empirical evidence from an experimental study of the proposed UML scheme on PHOLD benchmark fully confirms the theoretical outcomes of this paper.

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