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Sommario/riassunto	This book covers two main topics: First, novel fast and flexible simulation techniques for modern heterogeneous NoC-based multi-core architectures. These are implemented in the full-system simulator called InvadeSIM and designed to study the dynamic behavior of hundreds of parallel application programs running on such architectures while competing for resources. Second, a novel actor-oriented programming library called ActorX10, which allows to formally model parallel streaming applications by actor graphs and to analyze predictable execution behavior as part of so-called hybrid mapping approaches, which are used to guarantee real-time requirements of such applications at design time independent from dynamic workloads by a combination of static analysis and dynamic embedding.