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Technical Report

WCET Measurement-based and Extreme Value Theory Characterisation of CUDA Kernels

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Abstract

The massive computational power of graphics processor units (GPUs), combined with novel programming models such as CUDA, makes them attractive platforms for many parallel applications. This includes embedded and real-time applications, which, however, also have temporal constraints: computations must not only be correct but also completed on time. This poses a challenge because the characterisation of the worst-case temporal behaviour of parallel applications on GPUs is still an open problem. To address this situation, this paper proposes a measurement-based and statistical approach for the probabilistic characterisation of the worst-case execution time of such an application.