

# Mutual Exclusion Property Verification of FLASH Cache Coherence Protocol by Inductive Invariant Checking

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## ***Abstract***

We discuss a verification of the cache coherence protocol of the Stanford FLASH multiprocessor for arbitrary number of processors using the UCLID system to specify and verify the protocol. UCLID has a SAT-based decision procedure for a logic of counter arithmetic with lambda expressions and uninterpreted functions. We verified the mutual exclusion property for the protocol using just 8 inductive invariants. We discovered the invariants frugally, and solely from the analysis of counterexamples that UCLID returns, on deciding a property. The proof process is described step by step.