

NECLA Benchmarks: Non-linear decision problems

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There are 3 sets of benchmarks, that are grouped as follows: $e1-e4$, $s1-s4$, and $Ex1-Ex3$.

$s1-s4$, and $Ex1-Ex3$ are generated using our modeling of floating-point programs into a CFG representation with integer and real linear/non-arithmetic operations [1]. The modeling is geared towards analyzing numerical stability properties of such floating-point programs. Such models are analyzed using a BMC framework such as [1, 2] [3]. The decision problems correspond to BMC instances at different depths. $Ex1-Ex3$ are parameterized, for various input/output and precision requirements.

- $e1-e4$: These challenging benchmarks expose limitations of non-linear solvers.
- $s1-s4$: These benchmarks corresponds to analysis of numerical stability of a floating point program, as the result approaches 0.
- $Ex1$: This benchmark corresponds to checking the stability of multiplication of numbers within some range, as the result approaches *Infinity*.
- $Ex2$: This benchmark corresponds to checking the stability of multiplication of numbers within some range, as the result approaches 0.
- $Ex3$: This benchmark corresponds to checking the stability of division of a chosen number by some numbers within a range, as the result approaches 0.

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References

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