

# YicesLS on SMT COMP2021

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## SUMMARY

YicesLS is a wrapper SMT solver based on Yices 2.6.2, and it combines with a novel local search SMT solver called LS-IDL. This solver is especially designed for the Integer Difference Logic. It takes part in the Single Query Track and Model Validation Track.

## 1. DESCRIPTION

YicesLS is a wrapper SMT solver especially designed for Integer Difference Logic (IDL for short). It wraps the best solver for IDL, Yices 2.6.2(1). We also propose a novel solver named LS-IDL, and combine it with Yices. LS-IDL is a stochastic local search (SLS) solver, solving SMT(IDL) by directly operating on variables, and it breaks through the traditional DPLL(T)(2) framework. We first propose a local search framework by considering the distinctions between Boolean and integer variables. Based on the framework, we develop the SLS algorithm by designing the operators and scoring functions, which are two basic components of SLS algorithms. Moreover, we employ two forbidding strategies in local search for further optimization.

## 2. COMPETITION VERSION

Since LS-IDL is an incomplete algorithm, which means that it cannot solve UNSAT instances, it is combine with the best DPLL(T) solver for IDL, Yices, to obtain the wrapper solver, YicesLS. For Single Query Track, Yices is first run for 100 seconds, and LS-IDL is then run for 500 seconds. If LS-IDL still cannot find a satisfied assignment, Yices is applied for the rest of time. For the Model Validation Track which consists only of satisfiable instances, if the input formula is in the form of CNF, LS-IDL is applied, and otherwise Yices is applied.

## 3. SOURCES

The source code can be found in the Github:

<https://github.com/DouglasLee001/YicesLS>

## REFERENCES

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- [2] Robert Nieuwenhuis, Albert Oliveras, and Cesare Tinelli. Solving sat and sat modulo theories: From an abstract davis–putnam–logemann–loveland procedure to dpll (t). *Journal of the ACM (JACM)*, 53(6):937–977, 2006.