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pymwp: A Static Analyzer Determining Polynomial Growth Bounds

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- The property of interest: P-bounded variable growth
- Identify programs that satisfy "the property"
- We want to find a "growth bound"
- pymwp can answer this question for (some) C programs.

- J&K introduced a neat approach: mwp-flow analysis¹
- Many nice properties: syntactic, compositional, termination/loops, no “general reasoners” etc.
- But some challenges: non-det, failure...not enough yet.

¹Neil D. Jones and Lars Kristiansen. “A flow calculus of mwp-bounds for complexity analysis”. In: ACM Trans. Comput. Log. 10.4 (Aug. 2009), 28:1–28:41. doi: [10.1145/1555746.1555752](https://doi.org/10.1145/1555746.1555752).

- We added enhancements²
- How to handle non-determinism
- Addressing derivation failure
- The "early" pymwp

(Synergy?) developing pymwp continues to drive advancements to the analysis technique

²Aubert, Clément, et. al. "mwp-Analysis Improvement and Implementation: Realizing Implicit Computational Complexity". In: FSCD 2022. Vol. 228. LIPIcs, 2022, 26:1-26:23. doi: [10.4230/LIPIcs.FSCD.2022.26](https://doi.org/10.4230/LIPIcs.FSCD.2022.26).

- But still needed more for automatic analysis tool
- How to evaluate bounds?
- How to provide useful feedback to a software developer?

Most recent enhancements


Evaluating bounds, but efficiently

Most recent enhancements

Feedback on failure

pymwp is an automatic static analyzer for C code, to determine if program inputs' value growth is polynomially-bounded.

run in terminal



```
pip install pymwp  
pymwp file.c [ARGS]
```

run in browser

statycc.github.io/pymwp/demo



source code + docs: **statycc/pymwp**