

# MAGICAL - Genetic Algorithms for More Efficient In-memory Computation

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*Abstract—*

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## I. INTRODUCTION

Memristor Aided Logic (MAGIC) is an emerging computing paradigm making use of parallel, write-based systems to perform calculation in-memory [1]. This requires scheduling operations for the computation; however, the scheduling order, upon execution, may have substantially differing memory footprint requirements. State-of-the-art solutions model this dependence as a graph problem and perform scheduling as a graph covering problem. In this work, we characterize a number of properties of these evaluation graphs and apply those observations to the development of a genetic algorithm which produces reductions in the memory footprint of execution between 14% in the worst case and 26% in the best.

## II. PRIOR WORKS

## III. GENETIC ALGORITHM

## IV. EVALUATION

## V. RESULTS

## VI. DISCUSSION

## VII. CONCLUSION

## REFERENCES

- [1] S. Kvatinsky *et al.*, “MAGIC—Memristor-aided logic”, *IEEE Transactions on Circuits and Systems II: Express Briefs*, no. 11, pp. 895–899, 2014.