

# Asymptotically Fair and Truthful Allocation of Public Goods (Abstract Reprint)

Pouya Kananian<sup>1</sup>, Arnesh Sujanani<sup>2</sup> and Seyed Majid Zahedi<sup>2</sup>

<sup>1</sup> University of Toronto, Canada

<sup>2</sup> University of Waterloo, Canada

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## Abstract

We study the fair and truthful allocation of  $m$  divisible public items among  $n$  agents, each with distinct preferences for the items. To aggregate agents' preferences fairly, we focus on finding a core solution. For divisible items, a core solution always exists and can be calculated by maximizing the Nash welfare objective. However, such a solution is easily manipulated; agents might have incentives to misreport their preferences. To mitigate this, the current state-of-the-art finds an approximate core solution with high probability while ensuring approximate truthfulness. However, this approach has two main limitations. First, due to several approximations, the approximation error in the core could grow with  $n$ , resulting in a non-asymptotic core solution. This limitation is particularly significant as public-good allocation mechanisms are frequently applied in scenarios involving a large number of agents, such as the allocation of public tax funds for municipal projects. Second, implementing the current approach for practical applications proves to be a highly nontrivial task. To address these limitations, we introduce PPGA, a (differentially) Private Public-Good Allocation algorithm, and show that it attains asymptotic truthfulness and finds an asymptotic core solution with high probability. Additionally, to demonstrate the practical applicability of our algorithm, we implement PPGA and empirically study its properties using municipal participatory budgeting data.

## References

[Kananian *et al.*, 2026] Pouya Kananian, Arnesh Sujanani, and Seyed Majid Zahedi. Asymptotically fair and truthful allocation of public goods. *Journal of Artificial Intelligence Research*, 85, 2026.