

# Accepted Manuscript

No truthful mechanism can be better than  $n$  approximate for two natural problems

Stefano Leucci, Akaki Mamageishvili, Paolo Penna

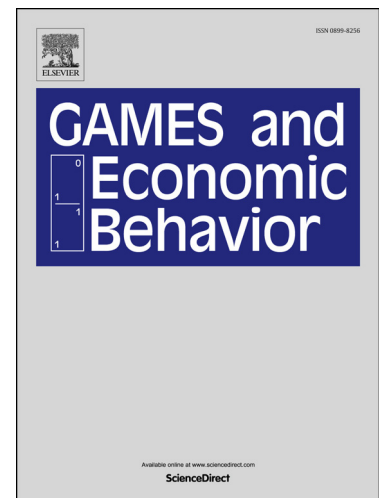
PII: S0899-8256(18)30071-X  
DOI: <https://doi.org/10.1016/j.geb.2018.05.003>  
Reference: YGAME 2864

To appear in: *Games and Economic Behavior*

Received date: 18 December 2017

Please cite this article in press as: Leucci, S., et al. No truthful mechanism can be better than  $n$  approximate for two natural problems. *Games Econ. Behav.* (2018), <https://doi.org/10.1016/j.geb.2018.05.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# No truthful mechanism can be better than $n$ approximate for two natural problems

Stefano Leucci<sup>1</sup>, Akaki Mamageishvili<sup>2</sup>, and Paolo Penna<sup>1</sup>

<sup>1</sup>Department of Computer Science, ETH Zürich

<sup>2</sup>Department of Management, Technology and Economics, ETH Zürich

## Abstract

This work gives the first natural non-utilitarian problems for which the trivial  $n$  *approximation* via VCG mechanisms is the *best possible*. That is, no truthful mechanism can be better than  $n$  approximate, where  $n$  is the number of agents. The problems we study are the min-max variant of the *shortest path* and the (*directed*) *minimum spanning tree* mechanism design problems. In these procurement auctions, agents own the edges of a network, and the corresponding edge costs are private. Instead of the total weight of the subnetwork, in the min-max variant we aim to minimize the maximum agent cost.

## 1 Introduction

One of the central issues in algorithmic mechanism design concerns the interplay between *optimization* and *incentives*. Roughly speaking, one would like to compute a solution which optimizes a function that *depends on some private information* held by the agents. In general, agents may find it convenient to misreport this information, and therefore optimization becomes a critical issue. To overcome this problem, one should design a *truthful* mechanism, that is, a combination of an algorithm and a suitable payment rule such that truth-telling is a *dominant strategy* for all agents.<sup>1</sup>

---

<sup>1</sup>Throughout this work we assume the standard *quasi-linear* utilities, meaning that each agent's utility is equal to the difference between the payment received and the private cost associated to the chosen outcome.

Download English Version:

<https://daneshyari.com/en/article/7352729>

Download Persian Version:

<https://daneshyari.com/article/7352729>

[Daneshyari.com](https://daneshyari.com)