

---

# Exact Price of Anarchy for Weighted Congestion Games with Two Players

Joran Van Den Bosse<sup>1</sup>, Marc Uetz<sup>1</sup>, and Matthias Walter<sup>\*†1</sup>

<sup>1</sup>University of Twente – Netherlands

## Abstract

We provide a complete analysis of worst-case equilibria for various versions of weighted congestion games with two players and affine cost functions. The results are exact price-of-anarchy bounds which are parametric in the weights of the two players, and establish exactly how the primitives of the game enter into the quality of equilibria. Interestingly, some of the worst-cases are attained when the players' weights only differ slightly. Our findings show that sequential play improves the price of anarchy in all cases. Methodologically, we obtain algebraic price of anarchy bounds based on the solutions of linear programs.

---

<sup>\*</sup>Speaker

<sup>†</sup>Corresponding author: [m.walter@utwente.nl](mailto:m.walter@utwente.nl)