

# ON THE EXTENSION OF WILF'S CONJECTURE TO SEMIMODULES OVER A NUMERICAL SEMIGROUP

PATRICIO ALMIRÓN AND JULIO JOSÉ MOYANO FERNÁNDEZ

ABSTRACT. The aim of this talk is to show an extension of the Wilf conjecture to semimodules over a numerical semigroup. The key point is the introduction of a new invariant that we call the Wilf function of a semimodule over a numerical semigroup [4, 3]. More concretely, we will show that the natural generalization of the Wilf conjecture to semimodules over the semigroup does not work unless we use the Wilf function of the semimodule. In this direction, we propose several questions regarding the possible extensions of Wilf-type inequalities for semimodules. The second part of the talk will focus on providing some answers to the extension of Wilf's conjecture in some particular cases.

## REFERENCES

- [1] P. Almirón, J.J. Moyano-Fernández, A formula for the conductor of a semimodule of a numerical semigroup with two generators, *Semigroup Forum* **103** (2021), 278–285.
- [2] P. Almirón, J.J. Moyano-Fernández, Supersymmetric gaps of a numerical semigroup with two generators, To appear in *Communications in Algebra* (2022), DOI: 10.1080/00927872.2022.2058521.
- [3] P. Almirón, J.J. Moyano-Fernández, Eliahou number, Wilf function and concentration of a numerical semigroup, To appear in *Quaestiones Mathematicae* (2022), DOI: 10.2989/16073606.2022.2041126.
- [4] P. Almirón, J.J. Moyano-Fernández, An Extension of the Wilf conjecture to semimodules over a numerical semigroup, Preprint, <https://arxiv.org/pdf/2012.01358.pdf> (2020).

P. Almirón; Instituto de Matemática interdisciplinar (IMI) y Departamento de Álgebra, Geometría y Topología, Universidad Complutense de Madrid.

*Email address:* palmiron@ucm.es

J. J. Moyano Fernández; Universitat Jaume I, Campus de Riu Sec, Departamento de Matemáticas & Institut Universitari de Matemàtiques i Aplicacions de Castelló.

*Email address:* moyano@uji.es

---

The first author has been partially supported by Spanish Government, Ministerios de Ciencia e Innovación y de Universidades MTM2016-76868-C2-1-P and PID2020-114750GB-C32.

The second author has been partially supported by the Spanish Government, Ministerios de Ciencia e Innovación y de Universidades, grant PGC2018-096446-B-C22, as well as by Universitat Jaume I, grant UJI-B2018-10.

The talk at the 8IMM 2022 has been given by the first named author.