Ideals of affine semigroups, MED-semigroups

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An affine semigroup S is called $\mathcal{C}$-semigroup if its complement in $\mathcal{C}$ is a finite set. A subset P of an affine semigroup S is an ideal of S if $P + S \subseteq P$, and an affine semigroup T is an $I(S)$-semigroup of S if $T \setminus \{0\}$ is an ideal of S.

The aim of this talk is based on [2]. We study the ideals of affine semigroups. In particular, we analyse $I(S)$-semigroups. Furthermore, we develop algorithms to compute all $I(S)$-semigroup under specific properties, providing a computational framework.

Several works about ideals of numerical semigroups have been extensively studied throughout the literature (for example, see [1], [3], [4] and, [5]).

In addition, we introduce the notion of affine semigroups with maximal embedding dimension (MED-semigroups), defined by their unique property that all elements in the intersection of their Apery sets, excluding zero, are minimal generators of S.

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References

[1] Anderson, D.D.; Johnson, E.W., *Ideal theory in commutative semigroups.* Semigroup Forum (1984), 30, 127–158.

[2] García-García, J. I.; Tapia-Ramos, R.; Vigneron-Tenorio, A.: *On ideals of affine semigroups and affine semigroups with maximal embedding dimension.* arXiv:2405.14648 `https://doi.org/10.48550/arXiv.2405.14648`

[3] Moreno-Frías, M.A.; Rosales, J.C., *Counting the Ideals with a Given Genus of a Numerical Semigroup.* Journal of Algebra and Its Applications **22 (8)**, (2023).

[4] Rosales, J.C.; García-Sánchez, P. A.; García-García, J.I., *Ideals of finitely generated commutative monoids.* Semigroup Forum (2003), 66, 305–322.

[5] Rosales, J.C.; García-Sánchez, P. A.; García-García, J.I., *Irreducible ideals of finitely generated commutative monoids.* Journal of Algebra (2001), 238, 328–344.