ON SOME ALGEBRAIC AND GEOMETRIC EXTENSIONS OF GOLDBACH'S CONJECTURE

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The goal of this talk is to study Goldbach's conjecture for rings of regular functions of affine algebraic varieties over a field. Among our main results, we define the notion of Goldbach condition for Newton polytopes, which allows us to prove in a constructive way that any polynomial in at least two variables over a field can be expressed as sum of at most $2r$ absolutely irreducible polynomials, where r is the number of its non–zero monomials. We also study other weak forms of Goldbach's conjecture for localizations of these rings. Moreover, we prove the validity of Goldbach's conjecture for a particular instance of the so–called forcing algebras introduced by Hochster. Finally, we prove that, for a proper multiplicative closed set S of $\mathbb{Z}$, the collection of elements of $S^{-1}\mathbb{Z}$ that can be written as finite sum of primes forms a dense subset of the real numbers.

The content of this talk is based on [BGR], where the reader can find all the details.

REFERENCES

[BGR] A. F. Boix and D. A. J. Gómez-Ramírez. On some algebraic and geometric extensions of Goldbach's conjecture. Available at https://arxiv.org/pdf/2312.16524.pdf. 1

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