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Tropical algebraic geometry. (English) Zbl 1109.14038
Jahresber. Dtsch. Math.-Ver. 108, No. 1, 3-32 (2006).

This is a survey of an active new field of mathematics, tropical algebraic geometry, which can be viewed as an algebraic geometry over the real max-plus algebra. The tropical varieties appear to be certain polyhedral complexes, the tropical morphisms are piecewise linear maps, and they appear, for example in logarithmic limits of complex algebraic varieties or as valuation images of algebraic varieties over non-Archimedean fields.

The author demonstrates some very general principles to translate algebro-geometric problems into purely combinatorial ones and illustrates this in several examples concerning plane tropical curves, among them tropical degree-genus formula, tropical Bézout theorem, group structure on a tropical elliptic curve, tropical computation of Gromov-Witten and Welschinger invariants of toric surfaces.

Reviewer: [Eugenii I. Shustin \(Tel Aviv\)](#)

MSC:

- [14N10](#) Enumerative problems (combinatorial problems) in algebraic geometry Cited in **46** Documents
- [05C99](#) Graph theory
- [12J10](#) Valued fields
- [12J25](#) Non-Archimedean valued fields
- [14A10](#) Varieties and morphisms
- [14M25](#) Toric varieties, Newton polyhedra, Okounkov bodies
- [14N35](#) Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebro-geometric aspects)
- [14P99](#) Real algebraic and real-analytic geometry

Keywords:

[enumerative geometry](#); [amoebas of algebraic varieties](#); [toric varieties](#)

Full Text: [arXiv](#)