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Non-properness set of a tropical polynomial map

lundi 21 octobre 2024 16:30 (45 minutes)

A tropical polynomial map is a piecewise-linear map between real Euclidean spaces. These maps represent a degeneration of classical polynomial maps between Euclidean spaces over valued fields. Accordingly, some of the pertinent classical topological invariants can be translated to polyhedral ones. In this talk, I will define the tropical analogue of the non-properness set of polynomial maps. This is the set of points at which the preimage has an extra solution "at infinity". Studying the non-properness set is beneficial to applications such as enhancing cylindrical algebraic decomposition algorithms from semi-algebraic geometry. The tropical non-properness set, on the other hand, is useful in describing the polyhedral geometry of piecewise-linear maps. I will present a correspondence theorem that relates the classical non-properness set to its tropical analogue, and illustrate a purely combinatorial procedure to compute it.

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