Geometry of representations of algebras

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Abstract

This short course will introduce participants to the geometry of representations of algebras, focusing on representation varieties of quivers (with relations). We will start with a concrete introduction to parametrizing representations with spaces of matrices satisfying certain conditions, and the corresponding bijection between orbits and isomorphism classes. This will include a brief recollection of relevant notions from algebraic geometry along the way. Next we will take an overview of the many connections between the representation theory of an algebra and the geometry of its representation varieties, covering for example the Artin-Voigt lemma, and various works of Bongartz, Riedtmann, and Zwara. In the last lecture, we will follow a line of inquiry initiated by Zelevinsky on the relation between orbit closures for Type A quivers and Schubert varieties.