

1054-16-2

Birge Huisgen-Zimmermann*, Department of Mathematics, University of California, Santa Barbara, CA 93106. *Representations of quivers with relations. Geometric aspects.*

We discuss the classification goal for the representations of a quiver (directed graph) with relations, and introduce/exemplify the concepts of finite, wild, and tame representation type. Classical results by Gabriel and Gelfand-Ponomarev in this connection have demonstrated the usefulness of parametrizing the isomorphism classes of representations of a fixed dimension d by the points of an affine variety; this variety carries an algebraic group action, the orbits of which are in one-to-one correspondence with the isomorphism classes of d -dimensional representations. Attempts to factor out the group action to obtain a fine moduli space for the representations – or doing so for interesting action-stable subvarieties – rarely succeed. The reason for failure lies in the fact that the orbits of the mentioned action are hardly ever closed. On the other hand, this obstacle gives rise to an alternate road towards understanding representations: Namely, the representations corresponding to the points in the orbit closure of a given representation M , the “degenerations” of M , provide an interesting venue for analyzing M by unravelling its structure in a geometry-guided process. We illustrate this approach, and present some old and new results. (Received September 15, 2009)