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4:00 PM

258 Hurley Hall

Title: Quiver Grassmannians with cell decompositions

Abstract:

The language of quivers and their representations is very useful for the investigation of modules of finite-dimensional algebras. It is particularly suitable for geometric methods which can for instance be used to classify certain quiver representations, but also to understand the set of subrepresentations of a fixed dimension vector of a fixed representation - so-called quiver Grassmannians. Apart from being important from the representation-theoretic point of view, it turned out that quiver Grassmannians are related to the theory of cluster algebras. This is because cluster variables of cluster algebras associated with quivers are generating functions of the Euler characteristics of quiver Grassmannians of certain representations. In this talk, we consider several instances in which quiver Grassmannians admit cell decompositions into affine spaces which means that the Euler characteristic is just the number of cells. We particularly investigate two methods which can be used to construct such a cell decomposition if it exists – torus actions on quiver Grassmannians and, moreover, a map between quiver Grassmannians induced by short exact sequences of representations. We then show how the construction of these cell decompositions can be used to obtain a combinatorial description of the (non-empty) cells – mostly in terms of certain subgraphs of a fixed graph. This combinatorial description can often be used to obtain an explicit description of generating functions of Euler characteristics of quiver Grassmannians and thus of cluster variables.