Lorscheid, Oliver; Weist, Thorsten
Quiver Grassmannians of extended Dynkin type $D$. Part 1: Schubert systems and decompositions into affine spaces. (English) Zbl 1462.13001

Publisher’s description: Let $Q$ be a quiver of extended Dynkin type $\tilde{D}_n$. In this first of two papers, we show that the quiver Grassmannian $Gr_e(M)$ has a decomposition into affine spaces for every dimension vector $e$ and every indecomposable representation of defect $-1$ and defect 0, with exception of the non-Schurian representations in homogeneous tubes. We characterize the affine spaces in terms of the combinatorics of a fixed coefficient quiver for $M$. The method of proof is to exhibit explicit equations for the Schubert cells of and to solve this system of equations successively in linear terms. This leads to an intricate combinatorial problem, for whose solution we develop the theory of Schubert systems. In Part 2 [the authors, “Quiver Grassmannians of type $D_n$. Part 2: Schubert decompositions and $F$-polynomials”, Preprint, arXiv:1507.00395] we extend the result of this paper to all indecomposable representations $M$ of $Q$ and determine explicit formulae for the $F$-polynomial of $M$.

MSC:
13-02 Research exposition (monographs, survey articles) pertaining to commutative algebra
13F60 Cluster algebras
14F45 Topological properties in algebraic geometry
14M15 Grassmannians, Schubert varieties, flag manifolds
14N15 Classical problems, Schubert calculus
16G20 Representations of quivers and partially ordered sets
05E10 Combinatorial aspects of representation theory
14M17 Homogeneous spaces and generalizations
16G60 Representation type (finite, tame, wild, etc.) of associative algebras

Full Text: DOI

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