Reiten, Idun  
Dynkin diagrams and representation theory of algebras. (English) Zbl 0940.16009  

The objective of this very well-written survey is to show how the Dynkin diagrams $A_n, D_n, E_6, E_7$ and $E_8$, and the associated extended Dynkin diagrams $\tilde{A}_n, \tilde{D}_n, \tilde{E}_6, \tilde{E}_7$ and $\tilde{E}_8$, occur in the representation theory of finite dimensional algebras. The author starts by showing how these diagrams can be characterised using additive and subadditive functions, or using quadratic forms. She points out the connection with the Weyl group of a finite connected graph without loops. She then turns to the representation theory of algebras, defines the notion of the path algebra of a quiver and then quotes Gabriel’s classification of the representation-finite path algebras by means of Dynkin diagrams. After briefly mentioning the connection with self-injective algebras (by means of the Auslander-Reiten quiver), she defines the preprojective algebra of a finite connected graph without loops, which is finite dimensional if and only if the graph is Dynkin, and Noetherian if and only if the graph is Dynkin or extended Dynkin. She ends up with the connection with rational double points and Cohen-Macaulay modules. No proofs are given in this survey, but there are a lot of easy illustrative examples.

Reviewer: I. Assem (Sherbrooke)

MSC:
16G20 Representations of quivers and partially ordered sets
16G60 Representation type (finite, tame, wild, etc.) of associative algebras
16G70 Auslander-Reiten sequences (almost split sequences) and Auslander-Reiten quivers
16G50 Cohen-Macaulay modules in associative algebras

Keywords:
extended Dynkin diagrams; finite dimensional algebras; representation-finite path algebras; self-injective algebras; Auslander-Reiten quivers; Cohen-Macaulay modules

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