Quiver Representations and Catogories of Modules

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Quiver representations in the modern approach are defined as a functor from the path category of a directed graph to vector spaces, but they can be defined using only linear transformations. They have been a fundamental concept of ring and module theory since the work of Gabriel and Auslander in the 1970s. Quiver representations of a directed graph are equivalent to the category of modules over the path algebra of that directed graph. The modules over the Leavitt path algebra defined by the same directed graph correspond to the quiver representations satisfying a natural isomorphism condition. In these lectures, basic concepts such as (finitely generated) projective, simple, indecomposable modules will be defined and examined in the context of Leavitt path algebras and what is known about their classifications will be explained. In addition, the results obtained so far in the TUBITAK 1001 project 122F414 will be mentioned. If time permits, topics such as the categorical approach and introduction to Morita theory will also be covered, depending on the interest and the level of knowledge of the participants.