Growth and Periodicity in Representation theory

We consider finite-dimensional modules of finite-dimensional selfinjective algebras which are not semisimple, which include group algebras, or Hecke algebras, and many others. Any such module has a minimal projective resolution, and one would like to know its rate of growth, that is, the complexity of the module. Sometimes but not always one can find it just from the module itself via a rank variety. We present a class of algebras with a complete answer.

Some algebras have only periodic modules, and hence have bounded projective resolutions, for example group algebras of quaternion groups over characteristic 2 but there are many others. We present some classification results.