Summary: Dominant dimension is introduced into integral representation theory, extending the classical theory of dominant dimension of Artinian algebras to projective Noetherian algebras (that is, algebras which are finitely generated projective as modules over a commutative Noetherian ring). This new homological invariant is based on relative homological algebra introduced by Hochschild in the 1950s. Amongst the properties established here are a relative version of the Morita-Tachikawa correspondence and a relative version of Mueller’s characterization of dominant dimension. The behaviour of relative dominant dimension of projective Noetherian algebras under change of ground ring is clarified and we explain how to use this property to determine the relative dominant dimension of projective Noetherian algebras. In particular, we determine the relative dominant dimension of Schur algebras and quantized Schur algebras.

MSC:
16E10 Homological dimension in associative algebras
16G30 Representations of orders, lattices, algebras over commutative rings
16E30 Homological functors on modules (Tor, Ext, etc.) in associative algebras
16P40 Noetherian rings and modules (associative rings and algebras)
20G43 Schur and q-Schur algebras

Keywords:
relative dominant dimension; relative Morita-Tachikawa correspondence; dominant dimension of Schur algebras and q-Schur algebras; strongly faithful modules

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