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Standard Koszul algebras, revisited (25-30)

This is a report on joint work with István Ágoston and Erzsébet Lukács. We prove a generalization of our earlier result concerning the quasi- heredity of the Yoneda extension algebra $(A^*, \mathbf{f})$ of a quasi-hereditary algebra $(A, \mathbf{e})$. Here we extend the results to graded Koszul algebras (not necessarily finite dimensional) which are standardly stratified (i.e. whose left regular modules are filtered by the standard modules, or equivalently, whose right regular modules are filtered by the proper standard modules). Call such algebras *standardly Koszul* if both the left standard and right proper standard modules are Koszul (i.e. they possess linear projective resolutions). Theorem: $(A, \mathbf{e})$ is standardly Koszul if and only if $(A^*, \mathbf{f})$ is standardly Koszul. The proof is based on matrix calculations with Hilbert and Poincaré matrices of the corresponding algebras.