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Universal deformation rings and tame blocks

Let k be an algebraically closed field of positive characteristic, and let G be a finite group. There are various classical results in the literature concerning the lifting of finitely generated kG-modules over complete discrete valuation rings, such as Green's liftability theorem. To understand and generalize these results, it is useful to reformulate them in terms of deformation rings.

Suppose B is a block of kG of tame representation type with defect group D. For certain B, we will show how to determine the universal deformation rings $R(G, V)$ of finitely generated kG-modules V belonging to B which have stable endomorphism ring isomorphic to k. We will relate $R(G, V)$ to the group ring WD where W is the ring of infinite Witt vectors over k.