LINEARISATION OF MULTIPLICATIVE GROUP ACTIONS
PRELIMINARY REPORT

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ABSTRACT. Let L be a $\mathbb{Z}G$ lattice and k a field on which G acts trivially. G acts multiplicatively on the quotient field $k(L)$ of the group ring $k[L]$. By constrast, G acts linearly on the field $k(V)$ formed by taking the quotient field of the symmetric algebra of the $\mathbb{Q}G$ vector space $V = \mathbb{Q}L$. The $\mathbb{Z}G$ lattice L is called *linearisable* if there is a G-equivariant field isomorphism between $k(L)$ and $k(\mathbb{Q}L)$. Here we examine bounds on the *degree of linearisability*, a measure of the obstruction for a $\mathbb{Z}G$ lattice to be linearisable. We connect these problems to earlier work with Vladimir Popov and Zinovy Reichstein on the classification of the simple algebraic groups which are Cayley and on determining bounds on the Cayley degree of an algebraic group, a measure of the obstruction for an algebraic group to be Cayley.