

The smallest subgroup whose invariants are hit by the Steenrod algebra

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Abstract: Let V be a k -dimensional double-struck capital F -sign₂-vector space and let W be an n -dimensional vector subspace of V . Denote by $GL(n, \text{double-struck capital } F\text{-sign}_2) \wr 1_{k-n}$ the subgroup of $GL(V)$ consisting of all isomorphisms $\varphi : V \rightarrow V$ with $\varphi(W) = W$ and $\varphi(v) \equiv v \pmod{W}$ for every $v \in V$. We show that $GL(3, \text{double-struck capital } F\text{-sign}_2) \wr 1_{k-3}$ is, in some sense, the smallest subgroup of $GL(V) \wr GL(k, \text{double-struck capital } F\text{-sign}_2)$, whose invariants are hit by the Steenrod algebra acting on the polynomial algebra, $H^*(BV; \text{double-struck capital } F\text{-sign}_2) \wr \text{double-struck capital } F\text{-sign}_2[x_1, \dots, x_k]$. The result is some aspect of an algebraic version of the classical conjecture that the only spherical classes in $Q_0 S_0$ are the elements of Hopf invariant one and those of Kervaire invariant one. © 2007 Cambridge Philosophical Society.

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