$=0$ and $KL^p=L$ if and only if every finite-dimensional L-module is completely reducible. The latter implies that $\mathrm{Ext}^1_{V(L)}(M, N)=0$ for all $V(L)$-modules M and N, finite dimensional or not, and therefore all $V(L)$-modules are projective and $V(L)$ has global dimension zero, i.e., $\mathrm{Ext}^n_{V(L)}(M, N)=0$ for all $n\geq 1$ and for all M and N.

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THE COHOMOLOGY OF THE STEENROD ALGEBRA; STABLE HOMOTOPY GROUPS OF SPHERES[1,2]

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In this paper, we state some of the results obtained by application of the methods of [4] to the study of the cohomology of the Steenrod algebra A. In brief, our results are a complete determination of $H^{s,t}(A)$ for $t-s\leqq 42$ in the mod 2 case, and for $t-s \leqq 2(p-1)(2p^2+p+2)-4$ in the mod p case, $p>2$. Due to the existence of the Adams spectral sequence [1], these results give information about the stable homotopy groups of spheres.

We recall that the mod p Adams spectral sequence $\{E_r\}$ (for the sphere) has differentials $\delta_r\colon E_r^{s,t}\to E_r^{s+r,t+r-1}$ and satisfies the properties:

(1) $E_2^{s,t}\cong H^{s,t}(A)$ as a Z_p-algebra.

(2) Each E_r is a differential Z_p-algebra.

(3) $\{E_\infty^{s,t}\mid t-s=k\}$ provides a composition series for $\pi_k(S;p)$ (relative to a suitable filtration); here $\pi_k(S,p)$ denotes the stable homotopy group $\pi_k(S)$ modulo the subgroup of elements whose order is finite and prime to p.

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[2] The work announced here is contained in the author's doctoral thesis, submitted to Princeton University.