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ON THE DIFFERENTIALS IN THE LYNDON-HOCHSCHILD-SERRE SPECTRAL SEQUENCE

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In this announcement we will state some results on the torsion of the differentials in the Lyndon-Hochschild-Serre (L-H-S) spectral sequence in the homology theory of groups and give some applications. Detailed proofs and further applications will appear elsewhere.

1. **Main result.** Let

$$N \rightarrowtail G \twoheadrightarrow Q \tag{1.1}$$

be a group extension with N abelian, characterized by $\alpha \in H^2(Q;N)$, and let A be a G-module. Then there is a L-H-S spectral sequence (see [**5**]) $\{E_r^{mq}(A), d_r^\alpha\}$, associated with (1.1), with $E_2^{mq}(A) = H_m(Q;H_q(N;A))$, converging to the homology of G with coefficients in A.

To the authors' knowledge, only the differential d_2^α has been studied ([**1**], [**2**], [**3**], [**4**]); nothing seems to be known about the higher differentials d_r^α, $r \geqq 3$.

To state our main result we introduce certain numerical functions κ, λ, σ. For any natural number h and any prime p, we write $p^e \| h$ to mean that $p^e | h$ but $p^{e+1} \nmid h$. Let q, f, n be natural numbers and define $a(p)$, $b(p)$ by

$$p^{a(p)} \| f, \qquad b(p) = \min(q, a(p) + 1).$$

Let n admit the prime-power factorization $n = p_1^{s_1} p_2^{s_2} \cdots p_l^{s_l}$, and define the functions κ, λ, σ by

$$\kappa(f, n) = \prod_{i=1}^{l} p_i^{s_i + a(p_i)},$$

$$\lambda(q, f, n) = \prod_{(p-1)|f;\, p \neq p_1, p_2, \ldots, p_l} p^{b(p)},$$

$$\sigma(q, f, n) = \begin{cases} 2\kappa\lambda & \text{if } f \text{ is even and } 2\|n \text{ or if } f \text{ is even,} \\ & n \text{ is odd and } a(2) + 2 \leqq q, \\ \kappa\lambda & \text{otherwise.} \end{cases} \tag{1.2}$$

Our main result is

THEOREM 1.1. *Let* (1.1) *be characterized by* $\alpha \in H^2(Q;N)$ *of order* n. *Then, provided that either*

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