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## A Nontrivial Product of Filtration $s+5$ in the Stable Homotopy Groups of Spheres (LL)

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摘要

关键词 [Stable homotopy of spheres](#) [Adams spectral sequence](#) [Toda--Smith spectrum](#) [May spectral sequence](#)

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**Abstract** In this paper, some groups  $\{\mathrm{Ext}\_A^{s,t}(Z\_p, Z\_p)\}$  with specialized  $s$  and  $t$  are first computed by the May spectral sequence. Then we make use of the Adams spectral sequence to prove the existence of a new nontrivial family of filtration  $s+5$  in the stable homotopy groups of spheres  $\pi\_{p^{nq+(s+3)pq+(s+1)q-5}}^S$  which is represented (up to a nonzero scalar) by  $\tilde{\beta}\_{s+2} \in \{\mathrm{Ext}\_A^{s+5, p^{nq+(s+3)pq+(s+1)q+s}}(Z\_p, Z\_p)\}$  in the Adams spectral sequence, where  $p \geq 5$  is a prime number,  $n \geq 3$ ,  $0 \leq s < p-3$ ,  $q = 2(p-1)$ .

**Key words** [Stable homotopy of spheres](#) [Adams spectral sequence](#) [Toda--Smith spectrum](#) [May spectral sequence](#)

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