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**On the towers of torsion Bertrandias and Payan modules.** (English) Zbl 1430.11150

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Summary: For an odd prime $p$, let $K/k$ be a Galois $p$-extension and $S$ be a set of primes of $k$ containing the primes lying over $p$. For the $p^r$th roots $\mu_{p^r}(K)$ of unity in $K$, we describe the so-called Sha group $\mathrm{Sha}_S(G(K/k), \mu_{p^r}(K))$ in terms of the Galois groups of certain subfields of $K$ corresponding to $S$. As an application, we investigate a tower of extension fields $\{k_{T^i}\}_{i\geq 0}$ where $k_{T^{i+1}}$ is defined as the fixed field of a free part of the Galois group of the Bertrandias and Payan extension of $k_{T^i}$ over $k_{T^i}$. This is called a tower of torsion parts of the Bertrandias and Payan extensions over $k$. We find a relation between the degrees $\{[k_{T^{i+1}} : k_{T^i}]\}_{i\geq 0}$ over the towers. Using this formula we investigate whether the towers are stationary or not.

**MSC:**

11R23 Iwasawa theory
11R34 Galois cohomology

**Keywords:**

Bertrandias and Payan modules; torsion; Galois groups

**Full Text:** DOI

**References:**

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