

Year: 2013	Vol.: 83	Fasc.: 3
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Title: The Gysin sequence for $\mathbb{S}^3$ -actions on manifolds

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Given a smooth action of $\mathbb{S}^3$ on a manifold M , we are interested in the relationship between the cohomologies of M and $M/\mathbb{S}^3$. If the action is free, we have indeed a principal $\mathbb{S}^3$ -bundle, and this relationship is described by the classical Gysin sequence, which also exists when the action is semi-free (i.e., fixed points are allowed) [2]. In this work, we obtain a Gysin sequence for the case of a general smooth action. An exotic term appears, and we show that it is an obstruction for the duality of the second term of the de Rham spectral sequence associated to the action.

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