RANK OF A MAXIMAL SUBGROUP IN $H^1(M, Z)$ WITH TRIVIAL CUP-PRODUCT

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Let M be a smooth closed oriented manifold, $h(M)h^{max}(M)$ be the maximal rank of a maximal subgroup in $H^1(M, Z)$ with trivial cup-product, and $h^{min}(M)$ the minimal rank of such a subgroup. It has been shown that the value of $h(M)$ characterizes the topology of Morse form foliations on M: e.g., if $rk\omega > h(M)$, where ω is a Morse form on M, then its foliation has a minimal component. We give upper and lower bounds on $h^{max}(M)$ and $h^{min}(M)$ in terms of the first and second Betti numbers. In addition, we calculate these values for a connected sum and direct product of manifolds.