

Some generic properties of non degeneracy of critical points

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We show some generic properties of nondegeneracy of critical points and we apply these results to obtain some estimates for the number of solutions of the equation $-\varepsilon^2 \Delta_g u + u = |u|^{p-2} u$ on the Riemannian manifold (M, g) of finite dimension n , with $2 < p < \frac{2n}{n-2}$ and $n > 2$.

Given (M, g) compact smooth Riemannian manifold of finite dimension n without boundary, we prove that for a generic metric g the critical points of the scalar curvature S_g are non degenerate. Moreover given a metric g_0 , and a bounded subset A of the Sobolev space $H_g^1(M)$, we prove that, if g lies in a neighbourhood of g_0 and the positive real number ε is small enough, then, generically with respect to the pair (ε, g) , all the positive solutions $u \in A$ of the equation $-\varepsilon^2 \Delta_g u + u = |u|^{p-2} u$ are non degenerate.

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