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Méthodes topologiques en analyse non linéaire:développements récents -
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On determining the homological Conley index of Poincar\'e maps

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We present a theorem on computation of the homological Conley index of an isolated invariant set of the Poincar\'e map associated to a section in a rotating local dynamical system ϕ. Let (N, L) be an index pair for a discretization ϕ^h of ϕ, where $h > 0$, and let S denote the invariant part of $N \setminus L$; it follows that the section S_0 of S is an isolated invariant set of the Poincar\'e map. The theorem asserts that if the sections N_0 of N and L_0 of L are ANRs, the homology classes $[u_j]$ of some cycles u_j form a basis of $H(N_0, L_0)$, and for some scalars a_{ij}, the cycles u_j and $\sum a_{ij}u_i$ are homologous in the covering pair $(\widetilde{N}, \widetilde{L})$ of (N, L) and the homology relation is preserved in $(\widetilde{N}, \widetilde{L})$ under the transformation induced by ϕ^t for $t \in [0, h]$ then the homological Conley index of S_0 is equal to the Leray reduction of the matrix $[a_{ij}]$. In particular, no information on the values of the Poincar\'e map or its approximations is required. The talk is based on the paper arXiv:2106.14293 (to appear in Topol. Methods Nonlinear Anal.).