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Maslov-type index and periodic solution of asymptotically linear Hamiltonian systems which are resonant at infinity. (English) Zbl 0831.34046

J. Differ. Equations 121, No. 1, 121-133 (1995).

This paper studies the asymptotically linear Hamiltonian systems (1) $\dot{z} \equiv JH'_z(z,t)$, $z \in \mathbb{R}^{2n}$, with commonly used notations. The function H satisfies the conditions 1. $H \in C^2(\mathbb{R}^{2n} \times \mathbb{R}, \mathbb{R})$ and H is 1-periodic in t; 2. $H'_z(z,t) = B_0(t)z + o(|z|)$ as $|z| \to 0$ uniformly in t; 3. $H'_z(z,t) = B_\infty(t)z + o(|z|)$ as $|z| \to \infty$ uniformly in t, where $B_0(t)$ and $B_\infty(t)$ are symmetric matrices in $\mathbb{R}^{2n}$, and continuous and 1-periodic in t. Using the Maslov-index theory, the author proves the existence of 1-periodic solutions of (1) in the resonant case that $B_\infty(t)$ is finitely degenerate and time dependent. The result of this paper generalizes a recent work of *K. C. Chang* [Research Report, No. 30, Inst. of Math. and Dept. of Math., Peking University (1991)].

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