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Oscillatory solutions of fourth order conservative systems via the Conley index.

We investigate periodic solutions of second order Lagrangian systems which oscillate around equilibrium points of center type. The main ingredients are the discretization of second order Lagrangian systems that satisfy the twist property and the theory of discrete braid invariants. The problem with applying this topological theory directly is that the braid types in our analysis are so-called *improper*. This implies that the braid invariants do not entirely depend on the topology: the relevant braid classes are *non-isolating* neighborhoods of the flow, so that their Conley index is not universal. (Received September 15, 2011)