

Méthodes topologiques en analyse non linéaire:développements récents -  
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## **Periodic solutions of damped nonlinear wave equations on $\mathbb{R}^N$**

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We shall present results of the existence of periodic solutions for damped nonlinear wave equations on  $\mathbb{R}^N$ , that are forced by a periodic nonlinear Lipschitz function  $f$ . The linear part consists of the Laplacian and a Kato-Rellich type functional  $V$ . Two distinct cases are studied: resonant and non-resonant ones. In the resonant case sufficient criteria for the existence of periodic solutions in terms of both Landesman-Lazer type and sign conditions are provided. In the non-resonant situation the interplay of the spectra of the wave operator for the linearized equations either at infinity or zero are exploited. The approach is based on the translation along trajectories operator and fixed point index for  $k$ -set-contractions, therefore due compactness properties and estimates are provided.