

Existence of a periodic solution for superlinear second order ODEs

Paolo Gidoni

*Polytechnic Department of Engineering and Architecture,
University of Udine, Udine, Italy*
paolo.gidoni@uniud.it

We prove a necessary and sufficient condition for the existence of a T -periodic solution for the time-periodic second order differential equation $\ddot{x} + f(t, x) + p(t, x, \dot{x}) = 0$, where f grows superlinearly in x uniformly in time, while p is bounded. The method is based on a fixed-point theorem which uses the rotational properties of the dynamics.

References

- [1] P. Gidoni, Existence of a periodic solution for superlinear second order ODEs, *Journal of Differential Equations* 345, 401-417 (2023), doi:10.1016/j.jde.2022.11.054 .