

New existence results for some singular relativistic problems

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In this talk we will discuss the existence of T -periodic solutions of some relativistic equations involving singular terms.

The first part will deal with the study of the Lorentz force equation

$$\left(\frac{q'}{\sqrt{1-|q'|^2}} \right)' = E(t, q) + q' \times B(t, q)$$

in the challenging physical configuration where the electric field E possesses a singularity in zero. Here, the existence of a T -periodic solution is achieved by using a variational framework built tailored on relativistic problems with singularities.

In the remaining part, we will employ both a variational and a topological argument to prove that the relativistic pendulum-type equation

$$\left(\frac{q'}{\sqrt{1-|q'|^2}} \right)' + q = G'(q) + h(t),$$

admits at least a periodic solution when $h \in L^1(0, T)$ and G is singular at zero.

These results are part of a joint work with David Arcoya.