

**Title:**

Periodic solutions of a discontinuous second-order differential equation modelling the porpoising effect

**Abstract:**

We construct a mathematical model in order to study the so called porpoising effect in racing cars. It consists of a scalar second order nonlinear oscillator where the nonlinear term corresponding to the ground force presents a jump discontinuity and the nonlinear term modelling the shock absorbers is of singular type (essential discontinuity). It seems the first time that both types of discontinuities are considered together in the related literature. The main result states that, when adding a small periodic perturbation, large-amplitude subharmonic solutions arise. It is proposed the extension of the model to two degrees of freedom. This is a work in collaboration with Alessandro Fonda.