

## On a generalized bicycle model

**Pawel Cesar Sanjuan Szklarz**

Warsaw University of Technology, Poland

The paper presents a generalized bicycle model, which is developed analytically and simulated with computer algebra systems. The model does not restrict the vehicle state space, its configuration and allows it to jump like the experienced bikers do. Nonholonomic constraints on the vehicle are derived from the condition of roll without slipping.

The motivation for the research is to develop a full nonlinear bicycle model. In the literature there are many bicycle models, however they all are specialized to some design or motion configurations. In the paper, a kinematic and dynamic model of a bicycle is presented. Thanks to the generality of the model, it can be specialized to a desired configuration bicycle or to a unicycle model. Modeling and motion simulation of two and one wheeled vehicles of different configurations illustrate the theory.

### Biography

Pawel Cesar Sanjuan Szklarz is pursuing her Ph.D. from Warsaw University of Technology from Poland.

[pszklarz@meil.pw.edu.pl](mailto:pszklarz@meil.pw.edu.pl)