

## PHD THESIS ABSTRACT

### ”CONTRIBUTIONS TO THE STUDY OF VEHICLES MOTION STABILITY”

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PhD thesis responds to some practical necessities characteristic to exploitation, vehicles motion stability representing one of main requirements asserted to means of transport with special destination, which must insure active and passive safety systems in order on decrease the number of accidents.

Main purpose of the PhD thesis is to elaborate and implement a theoretical and experimental study algorithm for vehicles motion stability using a systemic and interdisciplinary approach of the embedded electronic control systems of a vehicle.

In first chapter are presented some general aspects for the papers matter and a manouverability and stability approach synthesis for classical vehicles dynamics. There are mentioned main objectives of this paper.

Chapter 2 consists of experimental research. The objectives and equipment (vehicle, tester and software) technical characteristics used for data acquisition are presented along with a statistical analysis of experimental research results.

In chapter 3 there are presented mathematical models for the study of lateral dynamics of a vehicle in case of: lateral displacement and yaw angle, errors specific to imposed trajectory, sliding angle and angular yaw speed. There are also presented stationary regimes study and model for vehicle roll motion.

Chapter 4 presents the vehicle control stability. There are mentioned control algorithms for vehicles stability, wheels selective braking control strategy (with mathematical model, control architecture and impose values for controlled parameters), yaw motion control, rolling motion control and cruise speed control.

In chapter 5 is presented vehicles motion systemic stability study using concepts and algorithms specific to systems theory, including time and frequency response of system. Systemic stability theory and stability criteria are presented, especially aperiodic stability criteria whose response time periods are reduced, one of the most important requests for a control system. Systemic stability study is analysed in four important cases: yaw motion stability, stability in case of a mandatory trajectory, stability of stationary regimes and aperiodic stability in case of traveling.

Chapter 6 presents contributions to the experimental and theoretical stability study of vehicle dynamics. Some study directions offered by the PHD thesis are presented along with dissemination of the obtained results and the list of published papers.