

Stochastic estimate of the collision avoidance probability

Michael Ben Chaim, Moshe Brand, Boris Arav and Shlomo Ianets

*Department of Mechatronics,
Ariel University Center of Samaria,
Ariel, 40070, Israel*

E-mail: michailbc@ariel.ac.il / mosheb@ariel.ac.il / abl2007@netvision.co.il / yanetz@macs.biu.ac.il

Key words: Road safety, stochastic estimate, road accidents, Monte Carlo method, statistical models, probability of collision.

Determination which of the road-conditions parameters are directly associated to road-accidents recurrence is of importance in the field of road-accident prevention.

Given an accident scenario, it is a common practice to evaluate road-accidents related parameters via deterministic dependencies such as the driver's accuracy of the subjective assessment, his ability to implement a given task and car dynamics. Still, it is better to take into account also the statistical nature of such processes. The main advantage of a probabilistic evaluation is the synthesis between deterministic and stochastic characterizations. These may provide an answer for the vehicle motion, enabling, in turn, a scheme for accident prevention.

In this paper, we made an attempt to define probabilistic characterizations of road accidents in which an obstacle appeared. In order to do so previous incidents parameters were also taken into account (parameters associated to the vehicle, the obstacle, the road and the dynamics constructive characteristics of the vehicle etc.).

Our main result is a Monte-Carlo based calculation of a car-obstacle collision probability. Furthermore, we were able to extract some analytical dependencies, relating the incidents avoidance probability with some number influence arguments. Finally, these provided us with a platform for solving some practical problems in the field of road safety.