SUMMARY OF DOCTORAL THESIS

" TRAFFIC ACCIDENTS MODELLING, SIMULATING AND RECONSTRUCTING"

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The paper addresses an important issue from the field of land, road and rail vehicles, for modeling, simulating and reconstructing of traffic accidents which consists a permanent preoccupation of specialists from both fields. The main purpose of the paper was to provide a methodology and a common solving algorithm for those two types of land vehicles, considering that the vehicles are subject of the same mechanics laws, but each have some exploitation particularities.

In chapter 1 there is presented a synthesis of the current state of the approached problem in the paper, as well as the main objectives of the doctoral thesis.

Chapter 2 is for presenting the existing mathematical models in specialty literature. There are presented the main notions, adapted hypothesis and theorems from mechanics which are used. Centric and eccentric collisions are presented through the mathematical model with one, two, three and six freedom degrees.

Chapter 3 of the paper deals with the reconstruction of real road accidents that occurred during the operation. The main elements are reproduced and the reconstruction of accidents are carried out. Significant conclusions are drawn in practice and the possibilities of avoiding accidents are studied.

Chapter 4 is for railway accidents simulation. There are presented real railway accidents and the main notions of simulation for such accidents are given. Collisions and railway vehicle derailments simulations are presented. The values of the parameters for railway accidents, including the ones related to Nadal's criteria, are set and graphs are presented with them. Important conclusions are deducted for railway vehicles exploitations practice.

Chapter 5 of the paper deals with the simulation of mixed accidents, involving road vehicles and railway vehicles. There are presented real mixed accidents and the main notions of simulation of such accidents are given. The simulations of mixed traffic accidents are carried out by setting the values for those parameters. Important conclusions from practice are deducted and the possibilities of avoiding the mixed accident are studied.

Chapter 6 presents the main types of uncertainties encountered in practice. Simulation of railway accidents are carried out in the presence of uncertainties and conclusions are deduced regarding their influence on the accident parameters.

Chapter 7 of the paper aims to spectral analysis of traffic accidents. The need for such analysis is presented and the main spectral analysis techniques used in the specialty literature are presented. Frequency analysis and time-frequency analysis of road and railway accidents are presented.

Chapter 8 of the paper presents the main contributions made to the addressed issue and some of the opportunities offered by the paper are presented. It also highlights the way of dissemination of the research carried out by doctoral student and the list of works published by the author.