

I. IDENTIFICATION DATA

Thesis name:	Rear Suspension Sensitivity Study and Optimization
Author's name:	Nisant M Sethia
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Dept. of Automotive, Combustion Engine and Railway
Thesis reviewer:	Ing. Jan Baněček, Ph.D.
Reviewer's department:	Dept. of Automotive, Combustion Engine and Railway

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>Evaluation of thesis difficulty of assignment.</i>	
The assignment consists of two parts. The first part is a background research in the area of types of mechanisms used for rear wheel suspension in 2WD and 4WD passenger cars. The second part requires a solution of a typical optimization problem for the position of joints of the wheel suspension mechanism.	

Satisfaction of assignment	fulfilled with minor objections
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
The research part of the thesis is too brief and too descriptive. It mentions several best-known designs of the rear axle, without any attempt to classify them from the point of view of kinematic structure, although this is what determines the degree of interdependency between the basic kinematic parameters of the axle, and thus also the possibilities of their kinematic optimization.	
The basic kinematic characteristics are presented neither correctly nor completely. Instead of the requirements for suspension kinematics, the author presents functional requirements for the entire chassis of the motor vehicle.	
The most extensive part is dedicated to a procedure for analyzing one particular wheel suspension type. The model comes from the library of MSC ADAMS, the specific geometric values were provided by the thesis topic sponsor (Ricardo Prague s.r.o.). The entire procedure is described quite in detail and comprehensibly, from the point of entering the values up to the final description of the optimization experiment. Nevertheless, it is on the level of a user guide rather than a knowledge-based description.	

Method of conception	correct
<i>Assess that student has chosen correct approach or solution methods.</i>	
The procedure for looking for the solution here is determined by the tool used, MSC ADAMS. According to the report, the tool was used adequately in all stages of the solution.	

Technical level	D - satisfactory.
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The thesis suffers from several systematic errors.	
<ol style="list-style-type: none"> 1. Not all kinematic characteristics of the wheel suspension mechanism are defined correctly. Only three out of five of these characteristics have been investigated. Furthermore, one of the parameters – caster - is not even very important for the unsteered rear axle and is not easy to define. The position of the point of contact of the wheel with the road surface and the change thereof upon spring action are completely ignored. 2. On several occasions the thesis mentions terms and parameters which are used in dynamic examination of mechanisms. They are irrelevant to kinematic problems. 3. Kinematic properties of suspension mechanisms are assessed on the basis of the estimated impact on absolutely general properties of the chassis and the vehicle. This connection, however, is more likely on the level of a 	

superstition because in reality there are a number of different factors at work, and the impact of kinematics is therefore not conclusive.

All this, combined with the insufficient attention paid to the principles of the methods applied shifts the paper in the direction of a popular science text.

Formal and language level, scope of thesis

C - good.

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

No comment.

Selection of sources, citation correctness

C - good.

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.

The listed theory books on vehicle dynamics are not sufficiently utilized in the paper. Other resources are relevant to the topic and are carefully referenced in the text.

Additional commentary and evaluation

Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

No comment.

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

The paper represents a comprehensive demonstration of one of the possible solutions to the problem of optimization of kinematics of one type of wheel suspension. It uses standard modules of the SW used. However, it suffers from a number of inaccuracies and ambiguities which indicate inadequate understanding of the problem. This may also be due to insufficient consideration of the knowledge gained from the studies.

I evaluate handed thesis with classification grade **D - satisfactory**.

Date: **1.2.2019**

Signature: Ing. Jan Baněček, Ph.D.