

I. IDENTIFICATION DATA

Thesis name:	Improvement of the existing test stands
Author's name:	Raghavendar Balaji
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	Ing. Petr Hatschbach. CSc.
Reviewer's department:	Department of Automotive, Combustion Engine and Railway Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
The assignment of diploma work consists of three tasks to improve existing laboratory measurements: 1) Inertia moment measurement - addition of angle measurement and software modification. 2) Finalize the transmission error measurement. 3) Suggestion how to improve the control of the actuation force of disc brake on inertia test stand.	

Satisfaction of assignment	fulfilled
Student fulfilled all points of the assignment.	

Method of conception	correct
Student has chosen correct approach. Very important was careful and detailed description of the current state of experimental equipment. On this basis, he has improved experimental tasks.	

Technical level	B - very good.
<p>Student has very well used the knowledge gained by study, the recommended literature and the advice of the consultants.</p> <p>In the part of measuring momentum of inertia, the student has described in detail the theory of the moment of inertia calculation for complex 3D bodies. When student was familiarized with the existing test bench in the Juliska laboratory, then he chose the sensor for angle of inclination measurement, designed the sensor holder and programmed the control and evaluation application in LabVIEW. The other practice result is a printed circuit board (PCB) with connectors for easy photogate and inclinometer connection designed by student. Results of the control measurement were compared with the results obtained from the model created in the Catia 3D CAD system.</p> <p>Main result in the second part of diploma work is the program in LabVIEW which has been written to determine the fluctuation of movement in the gears from RPM measured using two incremental rotary encoders. The transmission error is evaluated during processing the data in NI DIAdem. Again, the existing experimental equipment and theoretical background of data acquisition and transmission error evaluation have been carefully described.</p> <p>In the third part a basic suggestion of a mechanism to actuate the hydraulic force of disc brake on inertia test stand was made. The proposed design has not yet been realized but meets the requirements given in the assignment.</p> <p>The installation and instruction manuals listed in annexures are very useful for carrying out experimental tasks with students.</p>	

Formal and language level, scope of thesis	B - very good.
<p><i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i></p> <p>Formal and language level is very good. Figures, drawings, tables and charts are well-arranged and well-done. Unfortunately, a mathematical description is sometimes inaccurate and not clearly comprehensible:</p> <ul style="list-style-type: none"> - Math symbol "x" is somewhere used as symbol for multiplication of 2 scalars (chapter 3, Eq. 1.32), somewhere as cross product operation of 2 vectors (chapter 4, Eq. 1.17, 1.19, ...) - Vectors are sometimes written with bold characters (Eq. 1.18), but mostly without any designation (like scalars). <p>Questionable is repeated use of certain parts of the text (e.g chapter 4.1, 4.2 and 4.4 vs. Annex 2a,b,c) and images (e.g Fig. 22 vs. Fig. 75 , Fig. 24 vs. Fig. 76).</p>	

Selection of sources, citation correctness

A - excellent.

Student used 37 correctly cited relevant references. Overview is well prepared and clear. Own results and used elements are correctly distinguished. Bibliographic citations are complete and in accordance with citation convention and standards.

Additional commentary and evaluation

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Presented diploma thesis fulfills all criteria needed for final master's thesis. Student clearly demonstrates his technical knowledge and very good engineering background. I appreciate in particular the careful documentation of all activities, which makes the diploma thesis very usable in the practical operation of experimental stands and for the work of his successors.

I evaluate handed thesis with classification grade **B - very good**.

Question:

- 1) In chapter 4.1 on page 13, you use the Cartesian coordinates x, y, z to specify the position of any point in 3D space. On the next page 14 you use the same coordinates x, y, z to specify the position of the point on the ellipsoid of inertia. Is that correct? They are really the same coordinates?
- 2) I do not exactly understand the comparison between the inertia moment measurements and the results obtained from the model created in the Catia 3D CAD system. Probable the coordinate systems are differently oriented. Differences would be appropriate to quantify.

Date: **28.1.2019**

Signature: