

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Comparison of selected nozzles for hybrid rocket engine</b>
<b>Author's name:</b>	<b>Anil Arjun</b>
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering (FME)
<b>Department:</b>	Department of Aerospace Engineering
<b>Thesis reviewer:</b>	Jan Klesa
<b>Reviewer's department:</b>	Department of Aerospace Engineering

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>ordinarily challenging</b>

<b>Fulfilment of assignment</b>	<b>fulfilled</b>
All assigned tasks were fulfilled.	

<b>Methodology</b>	<b>correct</b>
Used methodology is correct. Some aspects of the methods should be better described, e.g. CFD simulation and method of characteristics.	

<b>Technical level</b>	<b>C - good.</b>
Some important information is missing in the text, e.g. boundary conditions and computation settings at the CFD computation. Method of characteristics is used, however, any further description is missing. Description of Gaseq software is too brief. On page 23, $k$ represents specific heat ratio, not specific heat as is described in Table 3. There are discrepancies in the computation of mass flow rate on page 24.	

<b>Formal and language level, scope of thesis</b>	<b>C - good.</b>
The thesis is relatively difficult to follow because of missing explanation of some important technical details. Different font sizes are used with no reason. Thesis sufficiently extensive, English is satisfactory.	

<b>Selection of sources, citation correctness</b>	<b>A - excellent.</b>
References and information sources are adequate to the thesis topic. Student's work is clearly distinguished from earlier work. Citations corresponds to the standards.	

<b>Additional commentary and evaluation (optional)</b>



### III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Thesis cover very interesting topic of hybrid rocket engines. It brings interesting results, but some important items are missing in the text, e.g. settings of used software and better explication of used nomenclature. Due to this, it is relatively difficult to follow the text.

Questions for thesis defence:

- 1) Methods of characteristics is used for nozzle design (p. 27). Describe this method and explain its application for nozzle design.
- 2) Which boundary conditions and computation settings were used for the CFD computation in chapter 3.5?

The grade that I award for the thesis is **C - good**.

Date: **21.8.2019**

Signature: