

I. IDENTIFICATION DATA

Thesis title:	Bachelor Thesis .
Author's name:	Vishal Ravi.
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Instrumentation and control engineering.
Thesis reviewer:	Oleg Sivkov.
Reviewer's department:	Instrumentation and control engineering.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
The demand of the project is medium.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The thesis fulfils the assigned tasks, the goals have been achieved – the introduction and theory of this topic have been introduced, the model of the given prototype is described, the model with its experimental and simulation results are presented. Generally speaking, the model of frequency inverter for reducing THD signal is presented, necessary experimental results are obtained, it would be nice to present the concrete methods of harmonic reduction. Also another disadvantages of this thesis are mentioned in next points.	

Methodology	partially applicable
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
Methods used in thesis are applicable – after "1.Introduction" and "2.Theory" the model of laboratory inverter, experimental and simulation results are presented and described. The model of the whole laboratory converter is presented (chapter "3. Practical") – all its components like frequency inverter, induction motor, wattmeter is introduced with description of all their functions. Also the waveforms from oscilloscope to determine higher harmonics is shown there. In experimental results the harmonic frequencies are presented for different current values, THD and efficiency are calculated that fulfills the main task of the thesis. The simulation results in chapter "5.Model of frequency inverter" showed the model scheme of the whole prototype where output efficiency was calculated; on the other hand there were not waveforms at all; the waveforms definitely should be in the paragraphs where simulation results are implemented. In chapter "6.Conclusion" it is not explained the reasons of such high efficiency 350% that was obtained during experimental results with the highest THD at the same time. The measurement errors could occur but they would require explanation.	

Technical level	D - satisfactory.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
Some technical errors in thesis should be mentioned. If first two chapters – "Introduction" and "Theory" it is introduced as it should be, in further chapters a number of drawbacks are revealed from technical point of view. First of all the chapters with results should be named mainly as "Simulation results" and/or "Experimental results" instead of just "4.Results" and "5.Model of frequency inverter". The chapter name "3.Practical" is not good also from technical point of view., better it should be named as for example "Experimental model of inverter. The simulation results usually are described before the experimental therefore chapter of simulation results should be before experimental results. Also the simulation results that is "5.Model of frequency inverter" in this thesis should contain also some waveforms of simulation, at least one or two" in order to how from where the results were obtained and calculated.	

Formal and language level, scope of thesis

D - satisfactory.

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The structure of thesis is applicable; from formalities it is necessary to emphasize that in some chapter titles as "3.Practical", "4.Results", "5.Model of frequency inverter" should be better to have other names as it is mentioned in last points. Another remarks from language point of view like in page 10 it is said: "The frequency and size of output waveform" of what? Nothing mentioned about amplitude of voltage or current for example. The chapter "1.1.2.Working Principle" probably should be better named as "Principle of function". The same remark about the chapter 2.2.1. The abbreviations shouldn't be used in the titles of the chapter like in paragraph 3.1.1 VLT HVAC Drive. In page 23 – by sentence "Voltage vector control, also known as Direct Torque Control" it is said that vector control and torque control is the same method – that is factual error, I suppose it could be typing error. There are such text mistakes. When writing thesis one should pay attention also on grammar and sense and style of the text, etc..

Selection of sources, citation correctness

C - good.

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

23 citations were used. Totally thesis seems to contain the relevant sources for the current thesis topic, the proper articles are corresponded to that. Although there should be more sources investigating the problems of higher harmonics and their suppressing as the topic of thesis deals with that.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

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

Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.

Thesis is recommended to defense. However, some questions should be clarified at defense:

1. What could be the reasons of such high efficiency of almost 350%? The similar question – how at such high efficiency THD could be 19% the highest one from other measurements, while another correct measurement showed that higher THD the lower efficiency? Also why is the frequency highest in this points of measurement.
2. Draw the circuit diagram of the whole experimental prototype used in this thesis including measuring devises as wattmeter, oscilloscope and current and voltage sensors if possible. Explain briefly principle of function of the whole model.
3. Why efficiency calculated in simulation are so much higher than calculated in experimental results (As in simulation from Ltspice they are not less than 90% while in experimental results are such small values from 15%, and maximum is below 70% (not including great error 350%))? Explain the physical reasons.

The grade that I award for the thesis is **D - satisfactory.**

Date: **31.1.2023**

Signature: