

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Kirill Abrosimov

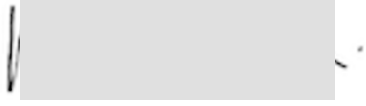
PhD Program: Engineering Systems

Title of Thesis: Inverted Brayton cycle for waste heat recovery application

Supervisor: Prof. Aldo Bischi

Co-supervisor: Prof. Andrea Baccioli

Name of the Reviewer:

I confirm the absence of any conflict of interest	 Date: 26-08-2024
---	--

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications
- The summary of issues to be addressed before/during the thesis defense

The thesis prepared by the candidate Kirill Abrosimov is well structured and written in all parts and the topics are well organized in clear and sequential manner. The thesis is organized in 5 chapters with a sound and comprehensive approach which helps the reader to understand the rationale of the research activities and its background.

The topic is highly relevant in the research field of energy engineering and for the improvement of energy efficiency of power generation in cases where conventional technologies are showing problems or cannot be applied. It is therefore an important contribution to the improvement of the energy system operation and flexibility which is fundamental to reduce the consumption of fossil energy and finally combat climate changes. It is also important for a more economically convenient power generation.

The two applications of the proposed concepts are different and studied with a rigorous approach and by providing interesting results both from the technical and the economic points of view. The results can be considered complete and obtained with a critical spirit and with a deep knowledge of the topic.

The further developments of the work are also well discussed showing the contribution of the candidate and the further activities to be explored, thus showing a clear path forward for the development of the concepts.

The methodology used in the thesis is based on numerical simulations of different configurations of the inverted Brayton Cycle, which offers significant advantages in comparison with the current alternatives, and it is important to mention the solid and extensive analysis of the state of art which is based on a large and comprehensive analysis of the literature. The results have been obtained by developing models with a well-known software platform, internationally acknowledged to produce reliable and scientifically accurate data. The two applications used as test cases are also representative and significant of the possible applications of the proposed innovation.

The results have been published in two high impact scientific Journals and in the proceedings of two international conferences with peer review and demonstrate the quality of the results and the capacity of the candidate to perform high level research at international level. This provides a good demonstration of the relevance of the results obtained and an international validation of the topics addressed.

The quality of the publications is therefore high, and the number is also very good for a PhD candidate.

The thesis does not require any amendments or changes before discussion and my recommendation is that the candidate be admitted to the final exam.

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report

The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense