



Hanoi, ...14/7..., 2026

MINUTES OF MASTER THESIS DEFENSE

The master thesis defense session of student: ..Nguyen...Ha...Thanh.....
(date of birth: 12/12/2001) was conducted at (hour/minute), on 14/7/2026
at VNU - International School.

Thesis title: Frequency Control of Islanded Microgrid
with Wind Energies

Major: MICE

Code: 8480111.01 QTD

Members of the Master thesis examination committee are present: .../3

No	Full name	University/ Organizations	Role in Committee	Note
1	<u>Dr. Tran Duc Quynh</u>	<u>VNU-IS</u>	Chair	
2	<u>Dr. Duong Quang Khanh</u>	<u>VNU-ITI</u>	Opponent	
4	<u>Dr. Diem Cong Hoang</u>	<u>VNU-IS</u>	Secretary	

PART I: INTRODUCTION

1. Representatives of VNU - International School made welcoming remarks including:

- Introduction of the master thesis defense and participants;
- Announcement about Decision of the President of Vietnam National University, Hanoi on establishing the Master thesis examination committee (Decision No. 2837./QD-DHQQHN issued on 24/6./2026.).

PART II: THESIS DEFENSE SESSION

1. Dr. Tran Duc Quynh..... - The Chair led the Master thesis examination committee.

2. Dr. Diem Cong Hoang – The Secretary of the Committee announced the scientific background and conditions for master thesis defense of the candidate (candidate's scientific background file and academic results are attached).

3. The candidate Nguyen Ha Thanh made a presentation on the thesis.

4. – Opponent commented on the thesis (with attached documents).

5. Questioning period from members of the Committee:

Q1: Why did the author select complex conjugate pole pairs? Given that this leads to output oscillation?

Q2: How can we determine the values of the simulation parameters?

Q3: What is the limitations of H_∞ method?

6. Candidate's answers

A1: That is the closest method, selecting parameters based on computer and experience.

A2: The values are compiled and cited from paper.

A3: This method is simple, only considering internal factors and not external ones.

7. The Secretary of the Committee commented on the thesis conducting progress of the candidate (with attached document).

8. Committee's Deliberations:

- Election of Vote counting committee:

1. Chair: Diem Cong Hoang

2. Member: Duong Quang Khanh

- The examination committee voted by secret ballot.

- The vote counting committee:

+ The Chair reported the vote counting result (with attached vote counting record).

- The Examination committee deliberated and came to a conclusion on the thesis examination by reaching a consensus on the assessment resolution on the thesis. The resolution concluded:

The thesis satisfies the requirements of the master degree

PART III: OUTCOME OF THE EXAMINATION PROCESS

1. The Chair of the Vote Counting committee announced the result of the ballot on the thesis examination.
2. The Chair of the Examination Committee announced the resolution on the thesis examination.
3. The Chair of the Examination Committee made statements and gave controls to the organizer.

The thesis defense session ended at 16⁴⁰⁰ (hour/minute), on 14/1/2026.

Hội đồng đánh giá đề án nhất trí thông qua đề án của học viên Nguyễn Hà Thanh... đạt yêu cầu với kết quả (thang điểm): 8.6. điểm (Bằng chữ: Eight point six). Học viên cần chỉnh sửa một số nội dung theo yêu cầu Hội đồng và nộp đề án hoàn thiện cho Trung tâm Thông tin - Thư viện, Đại học Quốc gia Hà Nội theo quy định.

SECRETARY OF THE THESIS
EXAMINATION COMMITTEE


Diem Cong Hoang

CHAIR OF THE THESIS
EXAMINATION COMMITTEE


Tran Diep Anh

Certification by VNU - International School

P.P. RECTOR

OFFICE OF ACADEMIC AFFAIRS


Hoang Thuyet Minh



Hanoi,14/7....., 2026

MINUTES OF VOTE COUNTING COMMITTEE OF THE MASTER THESIS EXAMINATION COMMITTEE

Pursuant to the Decision No. 2837.../QĐ-DHQGHN issued on 24/...6../2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee, the committee conducted a meeting at at 15:00 (hour/minute), on 14/...7../2026, at VNU - International School to examine the master thesis of the candidate ..Nguyễn Hà Thanh.....

Thesis title: Frequency Control of Islanded Microgrid
With Wind Energies.....

Major: ..MICE.....

Code: ..848.0111.01.QTD.....

The vote counting committee was voted:

1. Chair: ..Dr. Diem Cong Haang.....
2. Member: ..Dr. Duong Quang Thanh.....

The number of members presenting is ..03./03, the members who are opponents are 01./03

Number of votes distributed to members: 03.....

Number of unused remaining votes: ...0.....

Number of valid votes: ...03..

Number of invalid votes: ...0.....

Number of votes for the score 8.6 is: ..01...

Number of votes for the score 8.8 is: ..01....

Number of votes for the score 8.5 is: ..01..

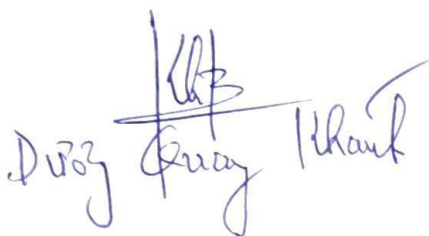
Average score: ..8:6 /...10...

(In text:Eight point six.....)

Note: The thesis score is the average of scores marked by the examination committee's members presenting in the thesis defenses session, taken to one decimal place and not rounded.

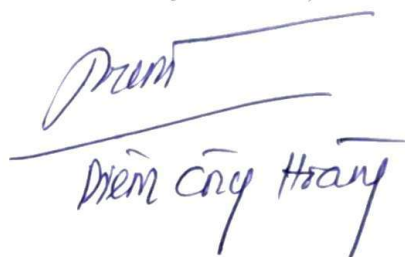
**MEMBER OF THE VOTE
COUNTING COMMITTEE**

(sign with full name)


Duong Quynh Thuan

**CHAIR OF THE VOTE
COUNTING COMMITTEE**

(sign with full name)

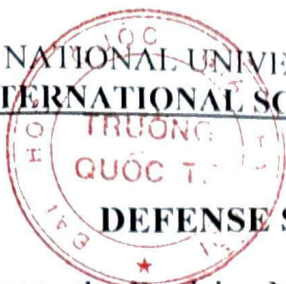

Diem Cng Hoang

Certification by VNU - International School

P.P. RECTOR

OFFICE OF ACADEMIC AFFAIRS


Hoàng Tuyết Minh



DEFENSE SCORE SHEET FOR MASTER THESIS

Pursuant to the Decision No. 2837.../QĐ-ĐHQGHN issued on 24...6.../2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee, the committee conducted a meeting at 15:00 (hour/minute), on 14...7.../2026 at VNU - International School to examine the master thesis of the candidate

Thesis title: Frequency control of Islanded Microgrid
with Wind Energies

Major: MICE

Code: 8480111.01 QTD

Comments:

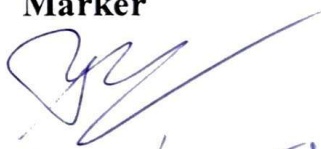
The student should spend more time to explain the
model and the way to formulate the problem
in a form of equation

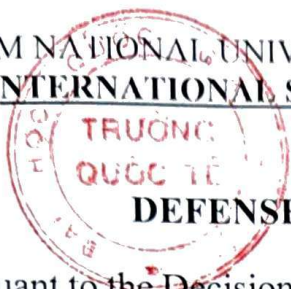
Result: (The mark of each committee member is on-point scale, possibly odd to one decimal place):

- In number:8,6..... marks
- In text: ...Eight point six marks

Hanoi, ...14/7....., 2026.

Marker


Tran Hie Quynh



DEFENSE SCORE SHEET FOR MASTER THESIS

Pursuant to the Decision No. 2837/QĐ-DHQGHN issued on 24/6/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee, the committee conducted a meeting at 15h00 (hour/minute), on 14/7/2026 at VNU - International School to examine the master thesis of the candidate

Thesis title: Frequency control of Islanded Microgrid
with Wind Energies

Major: MICE

Code: 8480111-01 QTD

Comments:

Understanding the problem
Answering the questions well



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Result: (The mark of each committee member is on-point scale, possibly odd to one decimal place):

- In number:8.5..... marks
- In text: ...Eight point five marks

Hanoi, 14.17....., 2026.

Marker


Marking Teacher
Nguyễn Thị Hằng



DEFENSE SCORE SHEET FOR MASTER THESIS

Pursuant to the Decision No. 2837.../QĐ-DHQGHN issued on 24...6.../2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee, the committee conducted a meeting at 15:00 (hour/minute), on 14...7.../2026 at VNU - International School to examine the master thesis of the candidate

Thesis title: Frequency Control of Islanded Microgrid
with Wind Energies

Major: MICE

Code: 848.0111.01 QTD

Comments:

Good

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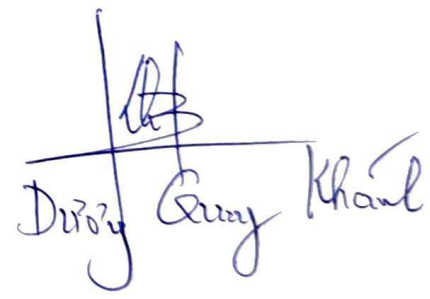
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Result: *(The mark of each committee member is on-point scale, possibly odd to one decimal place):*

- In number:8.8..... marks
- In text:Eight...point...Eight marks

Hanoi,14/7....., 2026.
Marker


Duong Quynh Khanh

EXAMINER' REPORT ON GRADUATION THESIS

Candidate: NGUYEN HA THANH

Thesis title: Frequency control of islanded microgrid with wind energies.

Major: **Informatics and Computer Engineering**

Code: **8480111.01QTD**

Examiner: Duong Quang Khanh, PhD.

Place of work: Information Technology Institute, Vietnam National University, Hanoi

I. COMMENT:

1. The necessity, scientific significance and practicality of the thesis:

The global energy landscape has undergone a significant transformation, driven by the increasing integration of renewable energy sources. Among these, wind energy has emerged as a leading alternative for electricity generation due to its environmental and economic advantages. In recent years, wind power has experienced significant growth and has been increasingly integrated into power systems as part of the transition toward clean energy sources. However, the large-scale penetration of Wind Turbine Generators (WTGs) into power grids introduces substantial and novel challenges to frequency regulation.

Thesis titled "Frequency Control of Islanded Microgrid with Wind Energy" derived a state-space mathematical model for an islanded power system. Based on this model, different controllers, i.e. Pole Placement method, advanced robust H_{infinity} using Linear Matrix Inequalities (LMIs) optimization based on Lyapunov theory and the Schur complement, multi-objective robust control method were designed to stabilize the system frequency against the continuous fluctuations of load and power generation.

After that simulation results were analysed, compared and proved the practicality of the designed controllers.

2. Reliability and relevance of the thesis *(which clearly states the non-duplication of the thesis, the relevance of thesis title to thesis content – of content to training major; reliability and modernity of research methodology, etc.)*

To the author's knowledge, the content of this thesis is appropriate to the study programme Informatics and Computer Engineering.

Author created a state-space mathematical model for an islanded power system. Based on this model, Pole Placement method, robust Hinfinity using Linear Matrix Inequalities (LMIs) based on Lyapunov theory and the Schur complement, multi-objective control method were designed to stabilize the system frequency against the continuous fluctuations of load and power generation.

3. Strong points and weak points of the thesis's content, structure, and format

Strong points:

- The thesis is clearly presented, well-structured and scientifically sound.
- Simulation results are reliable and proved the practicality.

Weak points:

- Many references in this thesis are outdated. Author should use related literature published within the last 5 years.
- Each chapter should start on a new page.
- The term Integral of Area Control Error $\int ACE dt$ should be defined and included in the List of Abbreviations.
- Please double check all the physical units in the List of Nomenclatures.
- Correct spelling and grammatical errors throughout the text (for example Chapter 4: Fundamental Control Method on page 5...)
- The author should present the construction and the working principle of Turbine Generator (TG) and Doubly-Fed Induction Generator (DFIG).
- Author should explain how the block diagram of Figure 1 was derived or obtained?
- In Section: 4.3: Theorem 2 should be introduced at the beginning of the section before being discussed.
- On page 72: Figure 35, 36, 37 do not match their corresponding description.
- Figure caption must appear on the same page as figure themselves.
- In Conclusion and future work, please correct the thesis title.

II. QUESTION (Optional)

- Pole Placement Method: Why did the author select complex conjugate pole pairs?
Given that this leads to output oscillation.
- How did the author select parameter values used for computation and simulation?
- In the author's opinion, what is the disadvantage of advanced robust H_∞ control compared to Pole Placement control?

III. CONCLUSION *(which clearly confirms the extent of satisfying requirements for a master thesis; whether the thesis can be submitted to the master thesis examination committee)*

I agree that the content of this thesis meets all the requirements for a Master's thesis and can be submitted to the examination committee for defense.

Hanoi, July 8, 2026

EXAMINER



Duong Quang Khanh



Hanoi, 14/7/2026

**RESOLUTION OF THE MASTER THESIS
EXAMINATION COMMITTEE**

Pursuant to the Decision No. 28.87...../QĐ-DHQGHN issued on 24/6/2026 by President of Vietnam National University, Hanoi on establishing the Master thesis examination committee to examine the master thesis of the student Nguyen Ha Thanh (date of birth: 12/12/2001)

Thesis title: Frequency Control of Islanded Microgrid with Wind Energies

Major: MICE

Code: 8480111.01QTD

The thesis examination committee conducted a meeting at 15 (hour/minute), on 14/7/2026 at VNU - International School.

After the candidate's presentation on the thesis, opponents' review, committee members' comments, candidate's answers, the committee deliberated and came to a conclusion:

1. The necessity, scientific significance and practicality of the thesis topic

Topic is urgent and highly valuable in the context of current energy transition.
Scientific significance is limited due to the use of linearized model.
The author needs to supplement the arguments that are closer to the actual measured data.

2. Structure, research methodology, references, etc., of the thesis

- well-organized structure
- Methodology is appropriate and widely accepted
- There are some points need to revise to ensure consistency and credibility.

3. Research outcomes:

The research results meet the initial objectives and suitable for master degree.

4. Limitations and requests for thesis correction (if any):

check again grammar error.

5. Overall evaluation

The thesis is good with clear results.
The thesis satisfies the requirements for master degree.

Thesis marked: 8.6/10

Outcome of master thesis defense of candidate Nguyen Ha Thanh

Qualified: ☒

Unqualified: ☐

(The thesis is qualified if the average score marked by the Committee is 5.5 or higher).

This resolution is passed by 03/03 members of the Committee.

SECRETARY OF THE THESIS
EXAMINATION COMMITTEE


Diem Cong Hoang

CHAIR OF THE THESIS
EXAMINATION COMMITTEE


Tran Diep Quynh

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Hoang Tuyet Minh