INFORMATION ON DOCTORAL THESIS

1. Full name: Do Huy Diep   2. Sex: Male

3. Date of birth: December 21st, 1983   4. Place of birth: Hanoi

5. Admission decision number: 1222/QĐ-CTSV Dated: December 6th, 2017

6. Changes in academic process:

7. Official thesis title: **: Research and development of linear ironless-core generator for wave energy converter**

8. Major: Engineering Mechanics   9. Code: 9520101.01

10. Supervisors: Assoc. Prof. Dang The Ba

11. Summary of the **new findings** of the thesis:

The main findings of the thesis are as follows:

Firstly, develop a technology solution in the field of wave energy conversion suitable to the economic and technical conditions for deep sea waters is a dual-buoy direct drive wave energy converter using linear ironless-core generator. The structural design of the equipment is uncomplicated, easy to manufacture, easy to operate, easy to deploy, easy to maintain and operate in deep sea conditions, contributing to the exploitation and use of renewable wave energy response to the needs of economic development, security and defense; suitable for the trend of using renewable energy and sustainable development.

Proposed a structure diagram; building simulation models and programs on Matlab - Simulink to calculate, simulate and survey the power of linear ironless-core generator according to the device's structural parameters.

Thirdly, calculated and surveyed the output powers of the linear generator models according to the structural parameters such as the arrangement of the arrays of magnets, the size of the coils, the diameter of the windings ... and determined some optimal structural features for the generator.

Finally, applied and determine how to strengthen the magnetic field through the generator coils by applying the arrangement of the magnet array according to the Halbach structure. Simulation calculations have been performed and a Halback structure has been

determined for linear ironless-core generator with a power increase of 10% compared to the existing structure.

Seven scientific articles are published in Scopus, specialized scientific journal, national conference and international conference.

12. Practical applicability, if any:

13. Further research directions:

In the next time, the PhD student will focus on studies which may solve some of the remaining limitations of the thesis. In particular, the author will focus on conducting these following studies:

- Develope and solve computational optimization problems to get the maximum energy conversion efficiency.
- Research and develop stabilizers and line straighteners to generate stable currents, suitable for connecting to the power grid.
- Manufacturing equipment according to design to check and compare with the results of calculation and simulation, in order to grasp the technology of manufacturing equipment with stable operation and reasonable price.

14. Thesis-related publications:

[1] <u>Đỗ Huy Điệp</u>, Đặng Thế Ba và Nguyễn Văn Đức (2019), "Tính toán và tối ưu hóa thiết kế máy phát điện dãy nam châm Halback cho thiết bị chuyển đổi năng lượng sóng", *Hội nghị cơ học toàn quốc In: Hội nghị Cơ học toàn quốc 2019*, 9/4/2019, Hà Nội

[2] <u>Do, Huy Diep</u> and Dang, The Ba and Nguyen, Van Duc (2019), "Design Of Linear Generator With Halbach Dual Magnet Structure According To Wave Energy Converter For Navigational Buoys". , *The 5th International Conference on Engineering Mechanics and Automation (ICEMA 5)*, 11-12 October 2019, Hanoi.

[3] <u>Do Huy Diep</u>, Nguyen Van Duc, Nguyen Xuan Quynh and Dang The Ba (2020), "Khảo sát từ trường của dãy nam châm kép sắp xếp theo cấu trúc Halbach trong máy phát tuyến tính sử dụng trong thiết bị chuyển đổi năng lượng sóng", TNU Journal of Science and Technology 2020, 225(14).pp 54 – 61. ISSN 1859-2171.

[4] <u>Đỗ Huy Điệp</u>, Nguyễn Văn Đức, Đặng Thế Ba (2020), "Ứng dụng MatlabSimulink trong tính toán suất điện động và công suất cho máy phát điện tịnh tiến sử dụng cấu trúc nam châm Halbach", *Hội nghị Cơ học Thủy khí toàn quốc 2020*.

[5] <u>Do Huy Diep</u>, Nguyen Van Duc, Nguyen Xuan Quynh and Dang The Ba (2020), "Optimizing linear generator design's parameters for output power using mix

numerical and analytical technique" *International Conference on Advanced Mechatronic Systems*, Hanoi, Vietnam, December 10 - 13, 2020.

[6] <u>Do Huy Diep</u>, Nguyen Xuan Quynh and Dang The Ba (2021), "Study on the field strength and the output power of the dual halbach magnet array based linear generator using mix calculation methods", *Int. J. of Advanced Mechatronic Systems*,2021 Vol.9 No.3, pp.174 – 183.

[7] <u>Huy Diep Do</u>, The Ba Dang (2021), "Study on the influence of period and wave amplitude on the output power of linear generator by numerical methods", *The 6th International Conference on Engineering Mechanics and Automation (ICEMA 6)*, November 14 2021, Hanoi.

Date: May 5, 2023

Signature: …………………

Full name: Assoc. Prof. Dang The Ba

Date: May 5, 2023

Signature: …………………

Full name: Do Huy Diep