Budapest University of Technology and Economics
Faculty of Mechanical Engineering
Department of Fluid Mechanics
http://www.ara.bme.hu/

FINAL PROJECT ASSIGNMENT

Publicly Available

Identification

Name: **Edelmayer Gábor Ábel**			ID: **76438992455**
Code of the Curriculum: 2NAAG0		Specialisation:	Document ref. number:
Curriculum:	Bachelor of Science Degree Program in Mechanical Engineering	2NAAG0-PE	GEÁT:2023-1:2NAAG0:YZORVS
Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Hydrodynamic Systems	
Supervisor:	Dr. Joshua Patrick Davidson (71569852589), research fellow		

Project Description

Title	**Improved Accuracy in the Modelling of Wave Powered Autonomous Sensor Networks in the Ocean** Megnövelt pontosság az óceánban lévő hullámhajtású autonóm érzékelőhálózatok modellezésében
Details	This project examines powering marine based sensors by harvesting energy from their local environment. Marine based sensor intrinsically operate in remote locations, traditionally requiring expensive maintenance expeditions for battery replacement and data download. Nowadays, modern wireless communication allows real-time data access, but adds a significant energy drain, necessitating frequent battery replacement. Harvesting renewable energy to recharge the MBSs battery, introduces the possibility of autonomous MBS operation, reducing maintenance costs and increasing their applicability. A wave energy harvester incorporated into the marine based sensor buoy should be an unobtrusive device that is easily deployable/retrievable and which can function at any deployment location regardless of the local wave climate. To design and evaluate such a wave energy harvester, a linear model was developed which enabled frequency domain analysis and efficient optimisation of the device parameters. The main objective of this project to assess the accuracy of the results obtained from this optimisation when more realistic nonlinear effects are included into the model. To achieve this goal, the following specific tasks must be implemented. 1. Literature survey – surveying and analysing relevant resources of technical literature 2. Include a nonlinear restoring force into the model and evaluate the results against the linear model 3. Include a nonlinear excitation force into the model and evaluate the results against the linear model 4. Include the effects of the oscillating internal mass into the model and evaluate the results against the linear model 5. Reporting – Summarise the work in the required document format of the MSc Thesis
Advisor	Advisor's Affiliation: Advisor: ,

Final Exam

1st subject (group)	2nd subject (group)	3rd subject (group)
ZVEGEVGBX01 Fluid Machinery	**ZVEGEÉEBG61** Process Engineering	**ZVEGEVGBG13** Fluid Flow Technology

Authentication

Handed out: 5 September 2022		Deadline: 9 December 2022
Compiled by: Dr. Joshua Patrick Davidson (71569852589) Supervisor	Verified by: *Dr. János Vad* (signed) Head of Department	Approved by: *Dr. Gábor Györke* (signed) Vice-Dean

The undersigned declares that all prerequisites of the Final Project have been fully accomplished. Otherwise, the present assignment for the Final Project is to be considered invalid.

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Edelmayer Gábor Ábel