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: **Silva Fujiyama Erik**			ID: **73611938353**
Code of the Curriculum: 2NAMW0		Specialisation: 2NAMW0-FM	Document ref. number: GEÁT:2022-2:2NAMW0:H3NEVN
Curriculum: Master Program in Mechanical Engineering Modelling			
Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics	
Supervisor: Dr. Kalmár-Nagy Tamás (71567010352), associate professor			

Project Description		
Title	**Parametric Resonance Modelling in 2 Degrees of Freedom** Kétszabadságfokú parametrikus rezonancia modellezése	
Details	Exploiting parametric resonance may enable increased performance for Wave Energy Converters (WECs). By designing the geometry of a heaving WEC, it is possible to introduce a heave-to-heave Mathieu instability that can trigger parametric resonance. To evaluate the potential of such a WEC, a computationally efficient analytical model has been developed for a heaving buoy with a non-constant waterplane area in monochromatic waves. To increase the validity and the applicability of this model, it needs to be extended to consider the motion in other relevant degrees of freedom such as pitch. The following tasks are required for the project. 1. Surveying and analyzing relevant resources of technical literature 2. Deriving an analytical model structure for multiple degrees of freedom (Heave and Pitch) 3. Identifying position-dependent coefficients for the model parameters 4. Simulation and analysis of the model 5. Code-to-code verification of the model results against a high fidelity benchmark simulation 7. Summarize 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)	4th subject (group)
ZVEGEÁTNW02 Computational Fluid Dynamics	**ZVEGEÁTNW03** Fluid Mechanics Measurements	**ZVEGEÁTNW08** Building and Environmental Aerodynamics	**ZVEGEÁTNW11** Open Source Computational Fluid Dynamics

Authentication			
Handed out: 14 February 2022		Deadline: 20 May 2022	
Compiled by: Dr. Kalmár-Nagy Tamás (71567010352) 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. …….. *Silva Fujiyama Erik*			