


# FINAL PROJECT ASSIGNMENT

**Publicly Available**

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| Identification   | Name: <b>Rochlitz Róbert Zoltán</b>                              |  | ID: <b>75759495298</b>                                 |  |
|  | Code of the Curriculum: <b>2N-MW0</b>                            | Specialisation: <b>2N-MW0-FM</b>                                 | Document ref. number: <b>GEÁT:2023-1:2N-MW0:BR1BOC</b> |  |
|  | Curriculum: <b>Gépészeti modellezés mesterképzési szak</b>       |  |  |  |
|  | Final Project issued by:<br><b>Department of Fluid Mechanics</b> | Final exam organised by:<br><b>Department of Fluid Mechanics</b> |  |  |
| Supervisor: <b>Dr. Bak Bendegúz Dezső (79513977519), assistant professor</b> |  |  |  |  |

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|---------------------|---------|---|
| Project Description | Title   | <b>Mechanistic turbulence: energy transfer in multi-degree-of-freedom nonlinear oscillators</b><br>Mechanisztikus turbulencia: energiatranszfer több szabadságfokú nemlineáris oszcillátorokban   |
|                     | Details | <ol style="list-style-type: none"><li>1. Study the literature in the following fields: nonlinear vibrations, targeted energy transfer, energy cascade.</li><li>2. Prepare a computational notebook in Wolfram Mathematica environment to compute the vibration response of the proposed multi-degree-of-freedom system.</li><li>3. Construct the frequency energy plot of the proposed system.</li><li>4. Analyze the response of the system for different types of excitations including impulsive and continuous harmonic forcing.</li><li>5. Compute the Lyapunov exponents of the system to assess the quality of the dynamics</li><li>6. Incorporate nonlinear elements between the larger blocks as well and recompute the Lyapunov exponents of the system.</li><li>7. Analyze the response of this modified system for different types of excitations including impulsive and continuous harmonic forcing.</li><li>8. Summarize the work in the required document format of the MSc Thesis!</li></ol> |
|                     | Advisor | Advisor's Affiliation:<br>Advisor: ,  |

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| Final Exam | 1 <sup>st</sup> subject (group)                    | 2 <sup>nd</sup> subject (group)                    | 3 <sup>rd</sup> subject (group)                                       | 4 <sup>th</sup> subject (group)    |
|            | <b>ZVEGEÁTNW02</b><br>Computational Fluid Dynamics | <b>ZVEGEÁTNW03</b><br>Fluid Mechanics Measurements | <b>ZVEGEVGNW21</b><br>Unsteady Flow in Pipe Networks<br>(BMEGEVGNW21) | <b>ZVEGEVGNX26</b><br>Hemodynamics |

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| Authentication | Handed out: <b>5 September 2022</b>   |  | Deadline: <b>9 December 2022</b>                                    |   |   |  |
|                | Compiled by:<br><b>Dr. Bak Bendegúz Dezső (79513977519)</b><br>Supervisor   |  | Verified by:<br><b>Dr. János Vad (signed)</b><br>Head of Department |   | Approved by:<br><b>Dr. Gábor Györke (signed)</b><br>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.<br><br>.....<br><b>Rochlitz Róbert Zoltán</b> |  |   |  |   |  |