Student Talent Day
Institute of Applied Mechanics

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22. 04. 2026.

1. Introduction

- **Mechanics** is the branch of physics focused on the behavior of solid bodies when subjected to forces and other loading, encompassing their motion, equilibrium, deformation and other fields.

- **Engineering Mechanics** applies the principles of mechanics to solve engineering problems, for example:
  - ensuring equilibrium, buckling,
  - determining load-bearing capacity: design and analysis,
  - dynamics: ensuring prescribed motions, mechanism analysis.

- **Modeling**

→ ***describe real-world systems*** by capturing their most important features while simplifying or omitting aspects that are not essential for the analysis:

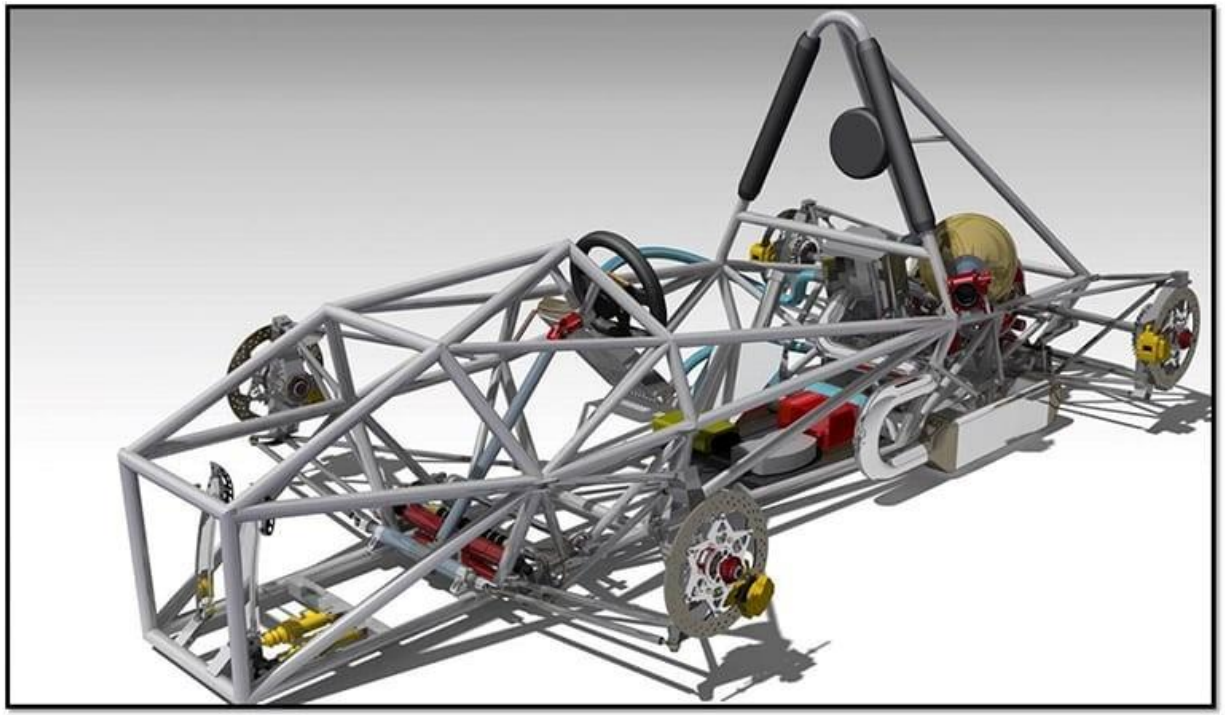
→ ***accuracy - solution time***,

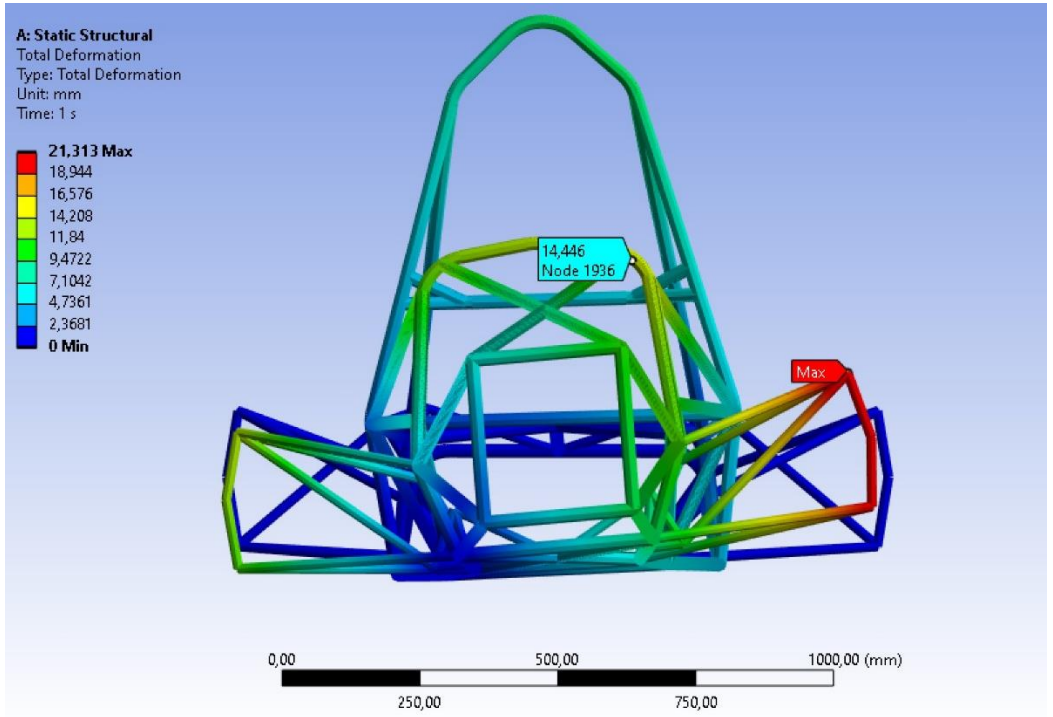
→ description of a system using mechanical and mathematical concepts,

→ set of variables and a ***sets of equations*** that establish relations between the variables.

- **Previous Research examples:**

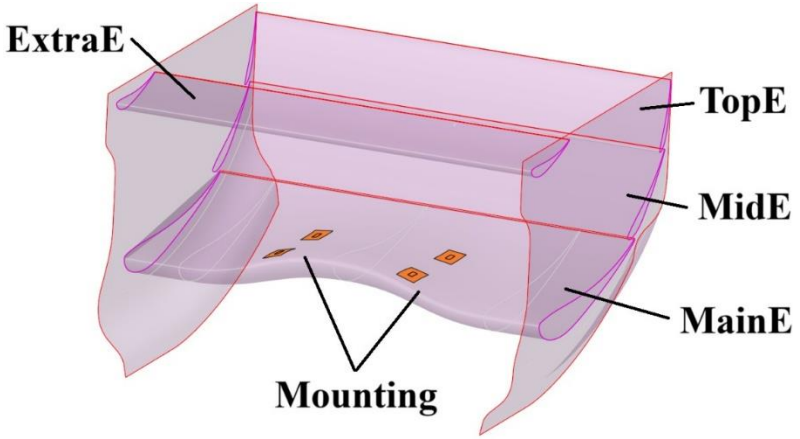
→ Vehicle dynamics: modeling of the frame of race car.

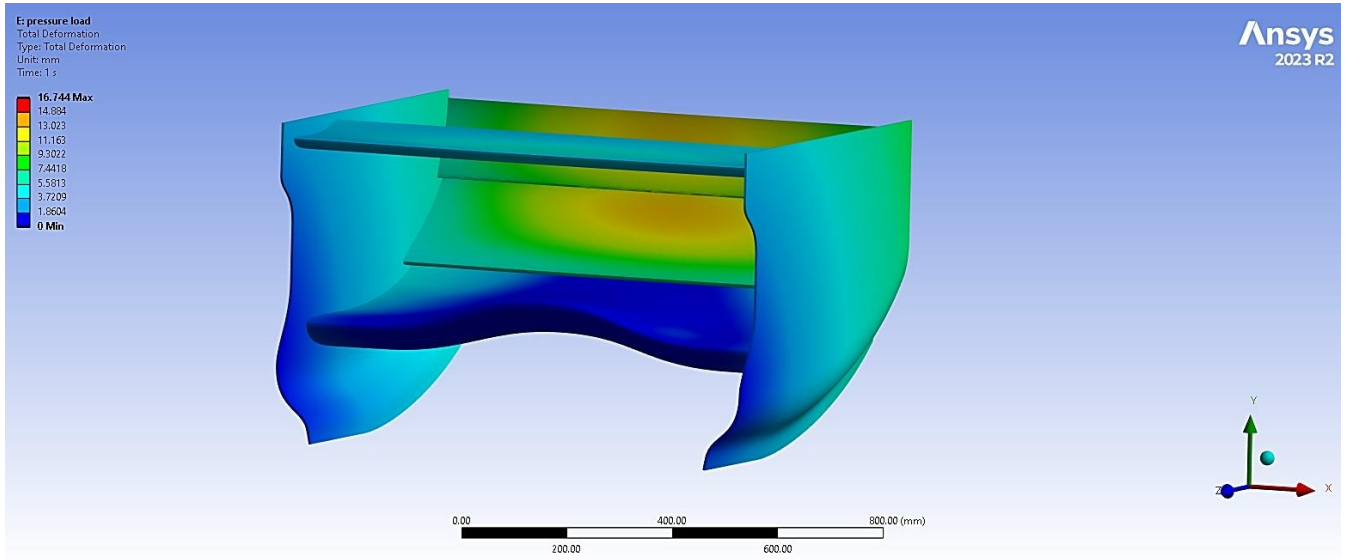


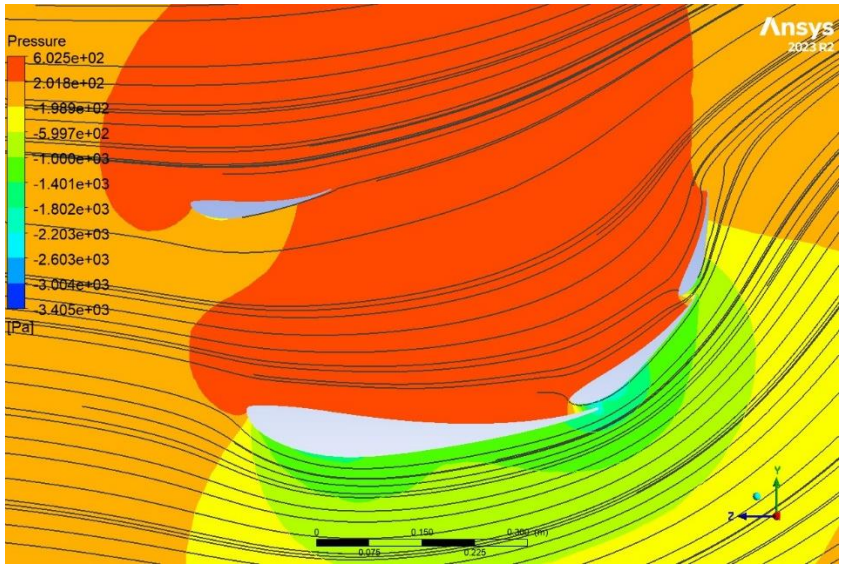


- **Previous Research examples**:

→ spoilers of a vehicle,
→ CFD and FEM.

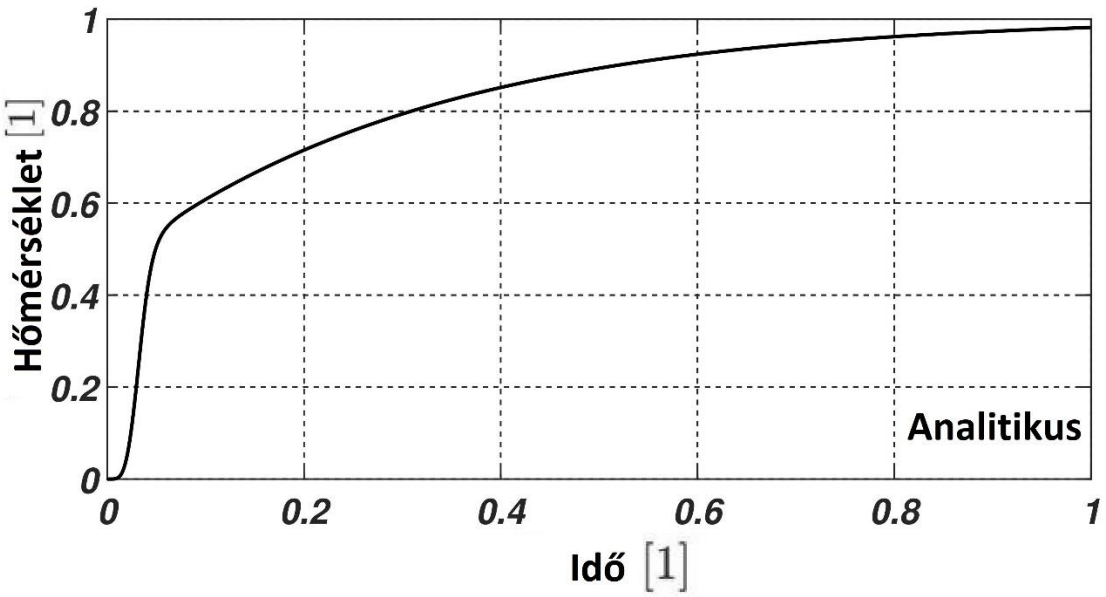


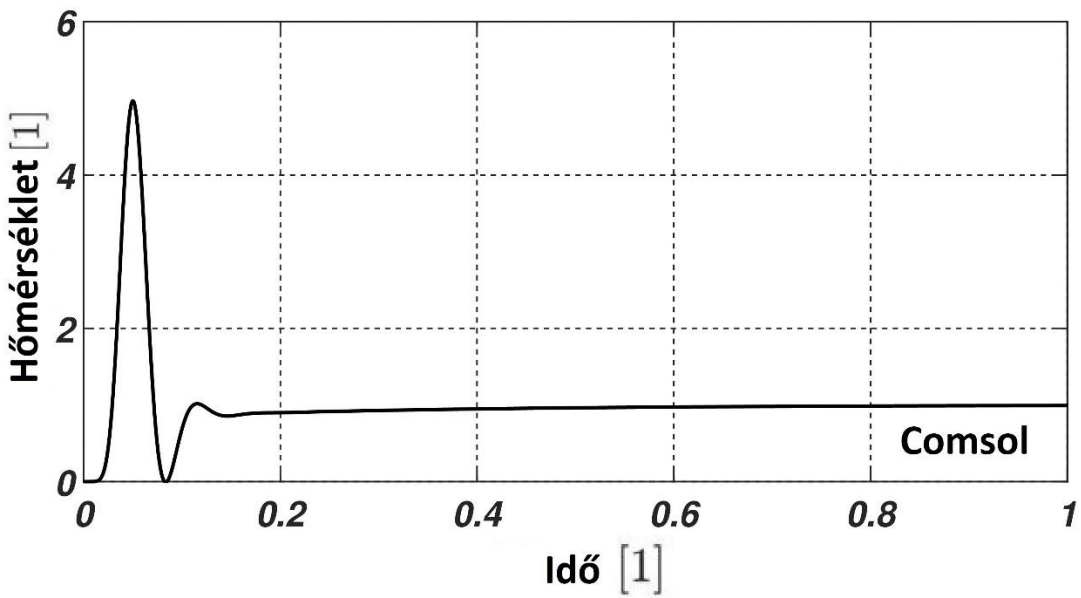




- **Previous Research examples**:

→ improving numerical solutions of thermomechanical problems.





Proposed topics:

- **Dr. Attila Baksa** (attila.baksa@uni-miskolc.hu)
  → Impact between a tennis ball and a tennis racket
  → Snap closure mechanism of an earring as a mechanical contact problem
- **Dr. Edgár Bertóti** (edgar.bertoti@uni-miskolc.hu)
  → Mathematical modeling of the mechanical behavior of materials
- **Dr. Dávid Gönczi** (david.gonczi@uni-miskolc.hu)
  → Optimization of the behavior of modern engineering structures using artificial intelligence methods

3. Research topics

- **Dr. László Péter Kiss** (laszlo.kiss@uni-miskolc.hu)
  → Imperfection analysis of structural elements
- **Dr. Ákos József Lengyel** (akos.lengyel@uni-miskolc.hu)
  → Mechanical analysis of beams with cross-sectional inhomogeneity
- **Dr. Sándor Szirbik** (sandor.szirbik@uni-miskolc.hu)
  → Finite element investigation of environmental effects on ground-mounted photovoltaic structures
- **Dr. Balázs Tóth** (balazs.toth@uni-miskolc.hu)
  → Development of a modern numerical method for solving models of irreversible thermodynamics

Thank you for your attention!