

Structural Analysis and Finite Elements

Computer labworks – introduction EM

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Part 0: model building

- model creation of the project problem,
- modeling choices to be made and justified (geometry, loads, BC, material),
- implication of the simplifications wrt the real problem?
- can the computational results be trusted?
- development of a critical mind!

Part I: development of Python FE code using TETRA4 FE

- link theory to practice,
- implement the formulas given in the course,
- complete missing parts of the code you receive,
- validate your FE.

Part II: use of a open-source FE code for structural analysis

- get familiar with meshing – solver – post-processing steps,
- build appropriate FE models of your project problem,
- compare predictions from commercial FE and your code.

Your project – Electromech. Engng.

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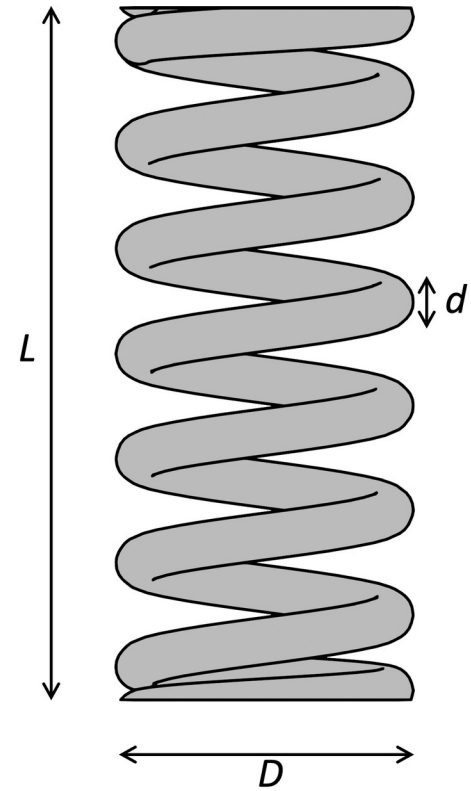


Fig. 1: Left: Kawasaki ZR-7 1999, Right: General spring geometry and dimensions.

Your project – Electromech. Engng.

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You are a group of engineers responsible for numerically estimating the stiffness of springs.

Your tasks:

- 1) Develop a simplified numerical model to estimate the stiffness of the front and rear suspension springs,
- 2) Calibrate the model using the experimentally measured stiffness of the front spring,
- 3) Compare predicted and experimental stiffness values for the rear spring and discuss discrepancies.

Deliverable *Identification Sheet* at Session 2!

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It gives the following information:

- questions you want to answer in your analysis,
- chosen geometry of the project problem,
- choice of an adequate material,
- estimation of loads,
- choice of boundary conditions,
- one single-sided A4 sheet, free format document.