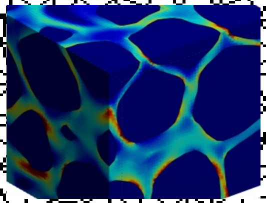

Structural Analysis and Finite Elements

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,
- <u>validate your FE.</u>

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.

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

Your project – Electromech. Engng.

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!

<u>It gives the following information:</u>

- 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.