MECHANICAL ENGINEERING M.SC SEMINAR

Wednesday, June 29 2022 at 13:30, Betty and Dan Khan Building, Auditorium 1.

Micro-Structural optimization for combined Thermal and Mechanical load-bearing materials

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This work demonstrates a surrogate model-based Thermo-mechanical optimization method of a composite representative volume element (RVE). The RVE model is based on a metallic honeycomb structure filled with polymeric lightweight resin and reinforced by inclined metallic fibers. A parametric model is generated and simulated using the Finite element method (FEM) with Thermo mechanical loading, periodic boundary conditions, and homogenization theory.

The 10dimensional parametric design space is spanned by the Latin Hypercube sampling algorithm using 5000 samples which are simulated using FEM simulation to calculate the effective Elastic and Thermal conductivity properties. The generated dataset is used to train a low-cost surrogate Neural Network(NN) model which is used for the multi-objective optimization process using NSGA II algorithm. The method presented shows a fast, accurate and flexible optimization method that allows altering the RVE Elastic, Thermal, and Density properties for the specific design task.

Note : The seminar will be given in Hebrew.

Seminars Coordinator: Assoc. Prof. Matthew Suss.