# MECHANICAL ENGINEERING STUDENT SEMINAR

**Thursday, July 14 2022 at 14:30**, Betty and Dan Khan Building, Auditorium 1
& In Zoom: https://technion.zoom.us/j/99784809170

## Topology optimization using length scale as a design variable

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Topology optimization is a widely used computational design method, that essentially finds the best possible distribution of material in a given design space. In many cases, a minimum length scale should be imposed to guarantee manufacturability of thin features. The most common tool for imposing the minimum length scale is by using a filter, much like in image processing. In traditional density-based topology optimization, the filter size is an input parameter and does not change during the iterative process. In this research, we extended the basic formulation of topology optimization and considered the minimum length scale as a design variable alongside the pseudo-density that determines the material distribution. At first, the filter size parameter was introduced as a single design variable, allowing the optimizer to find the best minimum length scale that is uniform in space. Later, we parameterized the filter size as a continuous field, enabling spatial variation of the minimum length scale within the design domain. In the seminar, two main applications of this approach will be presented and discussed. Each of the applications involves two competing objectives: 1) Finding designs that balance the maximization of stiffness and the minimization of stress concentrations; and 2) Finding designs that balance the maximization of stiffness and the maximization of the minimum feature size – the latter objective leads implicitly to simpler material layouts with fewer members and fewer holes.

Note: the seminar will be given in Hebrew

Seminars Coordinator: Assoc. Prof. Matthew Suss.