

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 27.03.17
(כט' באדר, תשע"ז), בניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

ירצה: יואלי יוסף

מנחה: פרופ"מ עודד אמיר, הפקולטה להנדסה אזרחית
מנחה שותף: פרופ"מ עידו חניאל, הפקולטה להנדסת מכונות

על הנושא:

Topology optimization with curvature constraints using a spline-based representation

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

Topology optimization is a computational method for finding the distribution of material within a certain domain, such that an objective function is minimized subject to a set of constraints. In the context of load-bearing structures, topology optimization aims at determining the layout of the structure by changing the boundary shape and the number of holes. Using topology optimization at a concept level can assist in finding the best performing design while saving time by replacing costly design iterations.

Practical engineering designs require that in a load-bearing structure the stresses will not exceed the admissible stress. Therefore, it is preferable that the structural layout will not consist of sharp corners where stress concentrations typically occur. Avoiding sharp corners is advantageous also for improving the manufacturability of optimized designs. The need for such engineering considerations motivates us to incorporate curvature constraints into the topological optimization framework. Such constraints are difficult to incorporate into standard topology optimization procedures that involve density variables on fixed finite element grids. However, they can then find their way into topological optimization processes within computer aided design (CAD) systems. To the best of our knowledge, this has never been achieved before and is the primary goal of the research.

The focus of this research is topology optimization with constraints on curvature radii. We explored methods to integrate a constraint on the radius of curvature of a shape's holes and boundary, within the topology optimization process. The methods are based on spline representations, which are the de-facto standard of modern CAD systems. These representations, which are not currently widely used in topological optimization, also have the advantage of enabling smooth boundaries without the need for any post-processing.

בברכה,

פרופ"מ שאול אולוסקי
מרכז הסמינרים