

סמינריון

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד' 30.12.2020
(טו' בטבת, תשפ"א), בשעה 13:30 באמצעות הזום :

<https://technion.zoom.us/j/96129936203>

מרצה : אלדר זכרון

מנחה : פרופ' ח' אמיר גת

על הנושא :

Aeroelastic instabilities of a chord-wise elastic airfoil

The seminar will be given in Hebrew

תקציר ההרצאה :

Standard rigid wings are characterized by substantial drag increase during activation of control surfaces, due to lack of continuity in airfoil geometry at the interface between the control surface and the airfoil. In recent years, shape-morphing airfoils are attracting much attention by solving the problem listed above. These morphing wings present no irregularity in the control surface regions, which in turn decreases the drag during maneuvering and improves overall performance. Additionally, this solution provides flexibility in optimizing the airfoil for different flight conditions. These shape morphing airfoils are characterized by significant chord-wise elasticity, commonly seen in flags, sails, membrane wings and many natural flyers, but otherwise neglected in conventional aircraft wing applications.

In previous works, we modeled the shape morphing wing as two, rear and front, Euler-Bernoulli beams connected to a rigid support at an arbitrary location along the chord. That setup was contained within a uniform potential flow field and the aerodynamic loads were modelled by thin airfoil theory. In the current work, we expand upon previous works by adding a tension spring and a torsion spring at the arbitrary rigid support, thus creating a classical, two dimensional, aeroelastic model with chordwise elasticity. The aim of this work is to study the static aeroelastic instabilities and characterize the effects of different parameters on the stability of the airfoil. Initially we find the deformation of the airfoil-spring setup and then present a new formulation for classical static instability, divergence, which accounts for both span-wise and chord-wise elasticity.

בברכה,

פ"מ א"ח א"א

מרכז הסמינרים