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Solutions for the polar orthotropic functionally graded annular disks having variable profile

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In this study, analytical solutions are presented for the polar orthotropic functionally graded annular disks having variable profile and rotating with constant angular velocity. The formulations were performed by referring to polar coordinate system. Small deformations, state of plane stress and rotational symmetry were presumed in the formulations. Elasticity moduli, disk thickness and density vary radially according to power law, while Poisson's ratios were constant valued. Rotating disks having two different types of boundary conditions were studied. These were (i) annular disks having traction free inner and outer surfaces and (ii) annular disks mounted on a circular rigid shaft having traction free outer surface. Two sample problems were presented that accounts the solutions developed for the two different boundary conditions considered in the study. The stress and displacement profiles were determined at the elastic limit angular velocities which were evaluated according to Hill's quadratic yield criteria. The effects of the degree of orthotropy were also examined.

Biography

Saad Essa has completed his PhD from Atılım University, Turkey in 2015. His thesis was related to functionally graded materials. He returned to his country in the North of Iraq and started teaching and doing research at the Civil Department in the Erbil Technical Engineering College.

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