

Study of the deflected mode of an incompressible elliptic cylinder with a hole

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The elastic equilibrium of a homogenous, isotropic, incompressible elliptic cylinder with a hole, when normal or tangent stresses are applied on its internal and external surfaces is studied. The cylinder is in a plane deformed state. Therefore, the boundary value problems are set and solved for an incompressible confocal elliptic ring in an elliptic coordinate system. The boundary value problems for a confocal elliptic ring are given with the superposition of the internal and external problems of an ellipse. For incompressible bodies, equilibrium equations and Hook's Law are written in the elliptic coordinate system, boundary value problems are set and solutions are presented with two harmonious functions, which are obtained by a method of separation of variables. Two test problems for a confocal elliptic semi-ring are solved and the graphs relevant to the numerical values are drafted.