

EXPLICIT PARAMETERIZATIONS OF A COMPLEMENTARY FAMILY OF NON-BENDING SURFACES

VLADIMIR PULOV* AND IVAÏLO MLADENOV**

ABSTRACT. We are interested in the shape of symmetrically loaded shells of revolution deforming without bending meaning that the normal at any point of the shell preserves its direction. The middle surfaces of such shells obey a quadratic relationship between the principal curvatures. These surfaces constitute a two parametric family of surfaces modeling axially-symmetric thin-walled shells with an additional boundary condition accounting for the disturbances in the equilibrium of the tangential stress resultants along the meridians at the points of a fixed parallel on the shell. The considered family of surfaces can be regarded as complementary to the four classes of equilibrium states of non-bending surfaces considered elsewhere.

The profile curves of the non-bending surfaces have not closed form description in elementary functions. Here we represent explicit parameterizations of the whole complimentary family in terms of the elliptic integrals and the Jacobian elliptic functions.

*TECHNICAL UNIVERSITY OF VARNA, **BULGARIAN ACADEMY OF SCIENCES
E-mail address: vpulov@hotmail.com, mladenov@bio21.bas.bg