EXPLICIT DESCRIPTION OF SOME CLASSES OF NON-BENDING SURFACES

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Abstract. Here we consider a family of axially symmetric surfaces modeling the shape of thin mechanical shells that are deformable without bending under uniform loading. With the exception of very few surfaces, like the well known right circular cylinder and the sphere, the surfaces of this family have no closed form description in elementary functions. Our main goal is to present their explicit parameterizations including both classes of open and closed families. We distinguish four classes of non-bending surfaces differing by their canonical representations using the normal elliptic integrals and the Jacobian elliptic functions.

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