ELASTIC STRIPS

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ABSTRACT. Elastic strips are critical points, among all arc lenght preserving variations, of the Sadowski functional $\int \kappa^2 \left(1 + \omega^2\right)^2$, where $\omega = \frac{\tau}{\kappa}$ is the ratio of the torsion τ and curvature κ of a curve γ in the three dimensional Euclidean space. This functional measures the bending energy of an infinitely narrow strip with axis γ lying on the rectifying developable of γ. It is shown that elastic strips has a constant invariant involving κ, ω and their first and second derivatives. Two new classes of elastic strips are described: elastic strips for which $\tau(1 + \omega^2)$ is constant and elastic strips for which $\kappa(1 + \omega^2)$ is constant. It is shown that the binormal curve of an elastic strip of the first class and the tangent curve of an elastic strip of the second class are spherical elastic curves.

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