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**The Shape of a Developable Möbius Strip via Classical Elastic Cosserat Rod Theory** ALEXANDER MOORE, TIMOTHY HEALEY, Cornell University — Recent efforts to find the equilibrium shape of an inextensible elastic Möbius strip have produced apparently conflicting approaches and results. While an earlier approach uses the traditional one dimensional Kirchhoff elastic rod, the latest effort claims that the strip must be modeled as an elastic two dimensional developable surface. This study explains the source of the discrepancy and demonstrates that a classical one dimensional Cosserat elastic rod can capture both types of behavior. Using numerical continuation methods, we show how to adapt traditional rod theory to approximate developable elastic strips and apply our method to the Möbius problem. We further analyze the stability of the equilibria obtained. The adapted rod theory holds promise for modeling the mechanics of other thin structures subject to curvature constraints.

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