A conserved quantity in thin body dynamics JAMES HANNA, HODJAT PENDAR, Virginia Tech — We use an example from textile processing to illustrate the utility of a conserved quantity associated with metric symmetry in a thin body. This quantity, when combined with the usual linear and angular momentum currents, allows us to construct a four-parameter family of curves representing the equilibria of a rotating, flowing string. To achieve this, we introduce a non-material action of mixed Lagrangian-Eulerian type, applicable to fixed windows of axially-moving systems. We will point out intriguing similarities with Bernoulli's equation, discuss the effects of axial flow on rotating conservative systems, and make connections with 19th- and 20th-century results on the dynamics of cables.

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