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Vakhtang Putkaradze* (putkarad@ualberta.ca), Department of Mathematics, University of Alberta, Edmonton, AB T6G 2J1, Canada. *Variation integrator methods for fluid-structure interactions.*

Abstract: Variational integrators for numerical simulations of Lagrangian systems have the advantage of conserving the momenta up to machine precision, independent of the time step. While the theory of variational integrators for mechanical systems is well developed, there are obstacles in direct applications of these integrators to systems involving fluid-structure interactions. In this talk, we derive a variational integrator for a particular type of fluid-structure interactions, namely, simulating the dynamics of a bendable tube conveying ideal fluid that can change its cross-section. The key to the method lies in the appropriate discretization of the fluid's back-to-labels map, coupled with a variational discretization with elastic part of the Lagrangian.

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