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Nonlinear Interactions between Slender Structures and Axial Flow LI DU, Nanjing University — For decades, dynamic behaviors of a slender structure with axial flow have been extensively studied. However, the governing equation based on expansions of small quantities is complicatedly-expressed and can be inappropriate as amplitude becomes considerably large. In this research, we are dedicated to finding an approach to study the nonlinear dynamics of a fluid-conveying slender strcture with arbitrary amplitude. By introducing the *Intrinsic Coordinate*, we find a concise way to describe the configuration of the system. Differential relations of such coordinate are studied and the rigorous nonlinear equation of motion is derived. Then rather than small-deflection approximation, linear dynamics are studied using *Argand Diagram* under a weaker condition named low-varying approximation. Nonlinear properties including Hopf bifurcation, limit-cycle motion and vibration frequencies are studied theoretically and experimentally.

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