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Nonlinear dynamics of three-dimensional vortex-induced vibration prediction model for a flexible fluid-conveying pipe

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Highlights

- A three-dimensional model is developed to predict the nonlinear VIV dynamics of a flexible fluid-conveying pipe.
- The geometric and hydrodynamic nonlinearities, internal flow, cross flow, and tension force effects are considered.
- Recognize the jumping phenomenon of a flexible riser with different internal and cross-flow velocities.
- The discontinuous jumping phenomenon of in-line response modal is discovered.
- The opposite variation between axial and in-line or cross-flow displacement amplitude and maximum stress within the modal transition region is revealed.

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