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Numerical Analysis of the Wake Control behind a Circular Cylinder with Oscillatory Rotation

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In this study, the wake flow is controlled via open-loop oscillatory rotation of a circular cylinder. The Karman vortex street is suppressed with this method of control, both, in experiment and in simulation. The results of natural and actuated numerical flow simulations are used as the input for POD analysis. With this approach the spatial distribution of empirical eigenmodes are elucidated. Actuation pushes the Karman mode downstream if the amplitude and frequency of the rotation are adequately chosen. Thus, the modal energy contains only a fraction of it original value of natural shedding.

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