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A Low-Order Galerkin Model Based on DMD and Adjoint-DMD modes[1] WEI ZHANG, MINGJUN WEI, Kansas State University — Dynamic Mode Decomposition (DMD) has emerged as a new tool for the understanding of flow dynamics associated with frequencies. The DMD modes computed by this process have been considered as an alternative of base functions for model order reduction. However, DMD modes are not orthogonal bases which are usually desired for the simplicity of Galerkin models. Therefore, we used the bi-orthogonal pair of DMD modes and adjoint DMD modes to solve this problem, and introduced an easy approach to derive a simple DMD-Galerkin projection model. The introduction of adjoint DMD modes also provides an easy way to rank DMD modes for order reduction. The approach is applied on a flow-passing-cylinder case in both transition and periodic stages. For the periodic case, DMD-Galerkin model is similar to POD-Galerkin model; and for the transition case, DMD-Galerkin model carries more clear frequency features.

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Mingjun Wei
Kansas State University

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