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Reduced Order Modeling of Fluid Flows

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Message from the Guest Editors

Numerical simulation of fluid flows requires enormous computational resources. Even with the improvements in the speed of computers, the computational cost of full-order simulations is extremely prohibitive due to the large number of degrees of freedom needed to resolve all of the flow features. Many successful model order reduction approaches have been introduced to reduce this computational burden and serve as surrogate models for fluid systems, especially in settings where the traditional methods require repeated model evaluations over a large range of parameter values. Topics in this call include, but are not limited to: projection-based approaches, reduced subspace or basis generation methods, regularization algorithms, data-driven methods, sparse sampling ideas and their implementations for fast predictive modeling, parameter identification, data assimilation, design, control, optimization and uncertainty quantification problems arising in fluid dynamics applications.

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