

Space-time fluid-structure interaction with adjoint-based methods for error estimation and optimization

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In this presentation, we focus on space-time modeling of fluid-structure interaction. Specifically, the adjoint equation in fluid-structure interaction is of interest [1, 2, 3]. Derivations for both stationary and nonstationary settings are undertaken. In the latter, the adjoint is running backward-in-time and must access the primal solution due to the nonlinearities. This is a computational challenge, but it is shown that the overall implementation is very promising and numerically robust. We demonstrate the performance in terms of error estimation and adaptivity [1], and optimal control [2] and some recent open-source documentation for the stationary case [3]. The presentation concludes with current developments and some preliminary findings of ongoing work [4].

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