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Transient growth in channel flow past a compliant boundary M. LISA MANNING, Department of Physics, UCSB, BASSAM BAMIEH, University of Virginia, JEAN M. CARLSON, Department of Physics, UCSB — Researchers have shown that transient amplification of non-normal modes plays an important role in transition to turbulence in three-dimensional channel flows. Although there have been many theoretical investigations of two-dimensional flows past compliant boundaries, transient amplification in three-dimensional flows interacting with flexible walls is not well-understood. Borrowing from techniques in control theory, we present an "input-output" analysis of transient amplification in a 2D/3C model for the fluid-flexible wall system. We first analyze the most amplified modes for the spring-backed plate wall model alone as a function of frequency and spanwise wavenumber, and show that the most amplified modes correspond to the "Class B surface waves" first described by Benjamin and Landahl. We then show how surface waves in a spanwise-stretchable wall influence the streamwise vortices that are most amplified in rigid wall channel flow.

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