

Abstract Submitted
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Heuristics for Effective Actuator and Sensor Placement in Feedback Flow Control¹ KEVIN CHEN, CLARENCE ROWLEY, Princeton University — Actuator and sensor placement can be just as consequential for the performance of localized feedback flow control as controller design. Yet, effective placement is not well understood, and the use of suboptimal placements is common. We report descriptions and characteristics of effective actuator and sensor placements for optimal flow control. We review optimal placements in the linearized Ginzburg–Landau and Orr–Sommerfeld/Squire models of fluid flow. We then analyze the feedback control of these models by relating physical observations with mathematical tools. Although these tools do not fully predict optimal placements, they do reveal patterns that most or all effective placements share. Most notably, effective actuator–sensor placements provide good authority over unstable modes and transient growth, and avoid large time lags between inputs and outputs.

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