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**A tutorial on resolvent methods** ATI SHARMA, University of Southampton, BEVERLEY MCKEON, California Institute of Technology — Arising from the interaction between control theory and more traditional fluid dynamics, resolvent analysis methods focus on the response of the fluid to dynamic disturbances. Many styles of this approach now exist, which variously consider that disturbance as a stochastic forcing, as an externally applied forcing, as internally generated Reynolds stresses, or as some combination thereof. In this tutorial paper, we shall introduce the theoretical viewpoint advanced by the authors in previous work. The approach is a complete and self-consistent restatement of the Navier-Stokes equations, which permits a series of progressively lower-dimensional approximations to be made. This viewpoint has a number of interesting characteristics that relate to other techniques. For example, the approach offers a more defensible alternative to eigenvalue stability calculations about a temporal-mean flow. The presentation will also highlight the natural links to the Dynamic Mode Decomposition and Koopman modes approaches. We shall illustrate the approach by reviewing some recent applications to passive and active flow control strategies, flow estimation, flow structure prediction, and flow spectra.

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