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Direct Calculation of Eddy Viscosity of Turbulent Channel Flow[1]

DANAH PARK, ALI MANI, Stanford University — This talk discusses a direct measurement of the eddy viscosity of turbulent channel flow using macroscopic forcing method (MFM), a statistical technique that utilizes DNS to determine turbulence closure operators. We introduce the eddy viscosity tensor, the leading-order form of the generalized eddy viscosity, and a methodology to compute this tensor for the turbulent flow using MFM. Our results provide the anisotropic eddy viscosity tensor as a function of distance from the wall. Additionally, for a subset of these tensorial components, we present the full eddy viscosity operator, which indicates a quantification of non-local effects beyond the leading-order eddy viscosity.

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