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Linear Navier-Stokes based model for turbulent channels with unstable stratification ANAGHA MADHUSUDANAN, SIMON ILLINGWORTH, IVAN MARUSIC, University of Melbourne — Studies have shown that the linearized Navier-Stokes equations model the coherent large-scale structures in turbulent wall-bounded flows reasonably well. In the present work we aim to understand if this linear model can be extended to study the coherent large-scale structures that have been experimentally and numerically observed in turbulent Rayleigh–Bénard–Poiseuille flows [e.g., Chauhan et al., 2013, Pirozzoli et al., 2017]. In particular, we concentrate on two features of these structures. First, we look at the wall-normal coherence of the streamwise constant modes. And second, we study the inclination angle of the large-scale structures in these flows. These features are then compared to the available results from numerical and experimental studies.

References

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