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Effect of inlet conditions on the turbulent statistics in a buoyant jet RAJESH KUMAR, National Institute of Technology Kurukshetra, Kurukshetra - 136119, ANUPAM DEWAN, Indian Institute of Technology Delhi, New Delhi - 110016 — Buoyant jets have been the subject of research due to their technological and environmental importance in many physical processes, such as, spread of smoke and toxic gases from fires, release of gases from volcanic eruptions and industrial stacks. The nature of the flow near the source is initially laminar which quickly changes into turbulent flow. We present large eddy simulation of a buoyant jet. In the present study a careful investigation has been done to study the influence of inlet conditions at the source on the turbulent statistics far from the source. It has been observed that the influence of the initial conditions on the second-order buoyancy terms extends further in the axial direction from the source than their influence on the time-averaged flow and second-order velocity statistics. We have studied the evolution of vortical structures in the buoyant jet. It has been shown that the generation of helical vortex rings in the vicinity of the source around a laminar core could be the reason for the larger influence of the inlet conditions on the second-order buoyancy terms as compared to the second-order velocity statistics.

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