

Abstract Submitted
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An alternative Lagrangian approach to laminar heat transfer

MICHEL SPEETJENS, Eindhoven University of Technology — Heat transfer in essence is the transport of thermal energy along certain paths in a similar way as fluid motion is the transport of fluid parcels along fluid paths. This similarity in principle admits Lagrangian heat-transfer analyses in terms of the geometry of such “thermal paths” analogous to the well-known Lagrangian analyses on chaotic mixing in viscous flows and micro-fluidics. To date such Lagrangian approaches towards laminar heat transfer represent convective heat transfer by the enthalpy flux. However, though conceptually entirely correct, this ansatz hampers physical interpretation of Lagrangian heat-transfer analyses, as the enthalpy is determined only up to a uniform background state. An alternative approach is proposed that may resolve this indeterminacy. This approach is outlined and demonstrated for the laminar heat transfer in a simple 2D unsteady flow.

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