

Madrid Summer Workshop Seminar

Information-theoretic causal inference for turbulent flow

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Causality, i.e., the mechanism by which one event contributes to the genesis of another., stands as a foundational concept in science. Despite its importance, the application of causal inference tools in turbulence research has been limited until very recently. In this presentation, we discuss the concept of causality and introduce a new definition rooted in information theory for chaotic dynamical systems. Information-theoretic causality is defined as the information transferred from among the variables in the dynamical system. This new definition offers several advantages: it is based on probabilities rather than intensities, it accounts for co-founding variables, it quantifies the effects of hidden variables, and it is invariant under bijective transformations of variables. Nonetheless, the approach is not exempt from limitations: it does not provide causality among individual events and requires a substantial amount of data and computational resources. We discuss the strengths and weaknesses of the new definition of causality and illustrate its use in gaining physical insight into relevant problems in turbulence research

Day: 21 June, Wednesday

Time: 11:00 h.

Place: E.T.S. Ingenieros Aeronáuticos

Aula Magna, Build. C. ground floor

Remote: <https://upm.zoom.us/j/86398306883>