

Abstract Submitted
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Image-based flow decomposition using empirical wavelet transform¹ JIE REN, XUERUI MAO, University of Nottingham, SONG FU, Tsinghua University — We propose an image-based flow decomposition developed from the 2D tensor empirical wavelet transform (EWT). The idea is to decompose the instantaneous flow data, or its visualisation, adaptively according to the averaged Fourier supports for the identification of spatially localised structures. The resulting EWT modes stand for the decomposed flows, and each accounts for part of the spectrum, illustrating fluid physics with different scales superimposed in the original flow. With the proposed method, decomposition of an instantaneous 3D flow becomes feasible without resorting to its time series. In contrast to proper orthogonal decomposition or dynamic modal decomposition that extract spatial modes according to energy or frequency, EWT provides a new strategy as to decompose an instantaneous flow from its spatial scales.

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