

Abstract Submitted
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Interscale energy transfer for band decompositions using spectral sharp and smooth filters¹ JULIAN DOMARADZKI, University of Southern California, DANIELE CARATI, Universite Libre Bruxelles — There is a consensus that a bulk of energy transfer in turbulence occurs between scales of similar size (local energy transfer) but a controversy persists concerning a role of nonlocal interactions, i.e., of much larger scales, in this process. In particular, a possibility exists that even qualitative conclusions may be affected by a choice of filters employed to define decompositions of velocity fields into bands. To address this question we analyze interscale interactions in DNS databases and compare results for band decompositions defined using classical sharp and smooth spectral filters, including Gaussian. In both cases, and for the range of scales available in DNS, the dependence of energy transfer on large scales in the energy containing range, i.e., the effect of nonlocal interactions, is always significant. However, for the Gaussian bands this dependence is observed to slightly diminish for increasing nonlocality. Many other features of interscale interactions are qualitatively similar in both cases. The main differences are mainly due to the exclusion of classes of interactions for sharp spectral bands because of the triangle inequality.

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