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Dependence of decaying homogeneous turbulence on initial/boundary conditions PEDRO VALENTE, CHRISTOS VASSILICOS, Imperial College London, TURBULENCE, MIXING AND FLOW CONTROL TEAM[1] — The von Kármán-Howarth equation implies an infinity of invariants corresponding to an infinity of different asymptotic behaviours of the double and triple velocity correlation functions at infinite separations. Given an asymptotic behaviour at infinity for which the Birkhoff-Saffman invariant is not infinite, there are either none, or only one or only two finite invariants. If there are two, one of them is the Loitsyansky invariant and the decay of large eddies cannot be self-similar. We examine the consequences of this infinity of invariants on turbulence decay. We then analyse recent wind tunnel data by Krogstad which show that the far-downstream decay of approximately homogeneous isotropic turbulent flows are, invariably, clearly different from Saffman turbulence; and that very clearly marked differences exist between the far downstream turbulence behaviours generated by conventional grids and multiscale cross grids. (See Phys. Lett. A375, 1010-1013 (2011) and http://arxiv.org/pdf/1106.0603)

[1]www.imperial.ac.uk/tmfc

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