

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Alternative Forcing for Homogeneous Isotropic Turbulence in Real Space G. MALLOUPPAS, B.G.M. VAN WACHEM, W.K. GEORGE, Mechanical Engineering, Imperial College London, Exhibition Road, London SW7 2AZ — An alternative to the linear forcing of Lundgren [1] is suggested for sustaining homogeneous and isotropic turbulence. The method depends on a random pseudo-velocity field produced initially from an arbitrary spectrum. Energy can be fed into a variety of different range of wavenumbers so that the resulting total turbulent kinetic energy remains constant. This talk will first introduce the methodology used to obtain 1D spectra and correlation functions which will then be used to validate the homogeneity and isotropy of the sustained turbulence. The effects of window functions on 1D spectra and correlations will be also addressed. Finally, the effect of initial conditions (i.e. triggering at different wavenumbers) on the statistics, especially spectra and correlation functions will be investigated, with a particular view toward understanding the variety of spectra generated by experiments, e.g., [2,3].

[1] Lundgren, T. S. (2003) Ann. Res. Briefs, CTR, Stanford

[2] Comte-Bellot, G. and Corrsin, S. (1971) JFM, 48, 273-337.

[3] Seoud, R. and Vassilicos, J. C. (2007) Phys Flids. 19.

W. K. George
Mechanical Engineering, Imperial College London,
Exhibition Road, London SW7 2AZ

Date submitted: 01 Aug 2011

Electronic form version 1.4