

Abstract Submitted
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A fast algorithm for the estimation of statistical error in DNS (or experimental) time averages PAOLO LUCHINI, University of Salerno - DIIN, SERENA RUSSO, University of Naples Federico II — A standard final step in the DNS (but the same can be said of experimental measurements) of turbulence, is the time- and space-averaging of the instantaneous results in order to give their means or correlations or other statistical properties. These averages are necessarily performed over a finite time and space window, and are therefore more correctly just estimates of the “true” statistical averages. The choice of the appropriate window size is most often subjectively based on individual experience, but as subtler statistics enter the focus of investigation, an objective criterion becomes desirable. Classical estimators of the averaging error of finite time series fall in two categories: “batch means” algorithms, fast but not very accurate, and ARMA methods, slower because they estimate the complete correlation function to start with. Here a modification of the batch means algorithm will be presented, which retains its speed while removing its biasing error. As a side benefit, an automatic determination of batch size is also included. Examples will be given involving both an artificial time series of known statistics and an actual DNS of turbulence.

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