A New Method for Estimating Intrinsic Reynolds Numbers
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— We present a method to
estimate the Reynolds number of a turbulent flow without any knowledge of exact
external boundary conditions. Considering the turbulent cascade as a Markovian
process the evaluation of the transition probability density of velocity increments on
different scales τ can be described by a Fokker-Planck equation which is completely
defined by a drift and a diffusion coefficient. The scale dependence of these coef-
ficients is given by simple polynomials, the parameters of which are a function of
Reynolds number. In particular the slope of the constant part of the diffusion term,
representing the Gaussian contribution to the general multiplicative noise is suit-
able to estimate the Reynolds number. This method has already been successfully
applied to flows of freejets as well as cylinder and grid wake flows.

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