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Marie Farge
CNRS-INSMI
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January 19th 2017
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American Institute of Physics, Physics of Fluids, 10(15), 2003.

Kai Schneider, Marie Farge
Coherent Vortex Simulation (CVS) of 2D bluff body flows using an adaptive wavelet method with penalisation

2002

Bartosz Protas, Kai Schneider, Marie Farge
Geometrical alignment properties in Fourier- and wavelet-filtered statistically stationary two-dimensional turbulence

Kai Schneider, Marie Farge
Adaptive Wavelet Simulation of a Flow around an Impulsively Started Cylinder Using Penalisation
Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

Abstract

The coherent vortex simulation (CVS) decomposes each realization of a turbulent flow into two orthogonal components: An organized coherent flow and a random incoherent flow. They both contribute to all scales in the inertial range, but exhibit different statistical behaviors. The CVS decomposition is based on the nonlinear filtering of the vorticity field, projected onto an orthonormal wavelet basis made of compactly supported functions, and the computation of the induced velocity field using Biot-Savart's relation. We apply it to a three-dimensional homogeneous isotropic turbulent flow with a Taylor microscale Reynolds number $R \lambda = 168$, computed by direct numerical simulation at resolution $N=256^3$. Only 2.9% of wavelet modes correspond to the coherent flow made of vortex tubes, which contribute 99% of energy and 79% of enstrophy, and exhibit the same $k^{-5/3}$ energy spectrum as the total flow. The remaining 97.1% of wavelet modes correspond to an incoherent random flow which is structureless, has an equipartition energy spectrum, and a Gaussian velocity probability distribution function (PDF). For the same flow and the same compression rate, the proper orthogonal decomposition (POD), which in this statistically homogeneous case degenerates into the Fourier basis, decomposes each flow realization into large scale and small scale flows, in a way similar to large eddy simulation (LES) filtering. It is shown that the large scale flow thus obtained does not extract the vortex tubes equally well as the coherent flow resulting from the CVS decomposition. Moreover, the small scale flow still contains coherent structures, and its velocity PDF is stretched exponential, while the incoherent flow is structureless, decorrelated, and its velocity PDF is Gaussian. Thus, modeling the effect of the incoherent flow discarded by CVS-wavelet shall be easier than modeling the effect of the small scale flow discarded by POD-Fourier or LES.
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Journal article by Marie Farge, Kai Schneider, Giulio Pellegrino, Alan A. Wray, Robert S. Rogallo

Abstract

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Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

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Gonosomal Algebra

Richard Varro

(Submitted on 22 Mar 2015)

We introduce the gonosomal algebra. Gonosomal algebra extend the evolution algebra of the bisexual population (EABP) defined by Ladra and Rozikov. We show that gonosomal algebras can represent algebraically a wide variety of sex determination systems observed in bisexual populations. We illustrate this by about twenty genetic examples, most of these examples cannot be represented by an EABP. We give seven algebraic constructions of gonosomal algebras, each is illustrated by genetic examples. We show that unlike the EABP gonosomal algebras are not dibaric. We approach the existence of dibaric function and idempotent in gonosomal algebras.

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1 Funding agencies should provide to the scientific community publicly-owned platforms, developed in open source software, for editing, publishing and archiving peer-reviewed articles, with the help of librarians, and publishers as contractors.

2 Funding agencies could thus control the quality of peer-reviewing, by selecting the journals having good practices and reputable editors.

3 Reading and publishing will be free to anyone. Publishing platforms will allow researchers to experiment new ways of publishing, e.g., open peer-reviewing.
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Created in 1999, it publishes 431 journals in Open Access, financed by public agencies from France (CNRS, EHESS, BSN, Aix-Marseille and Avignon universities).
Green open access is a wise model

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Vincent Larivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015

The gold open access model leads to the creation of predatory journals of very poor quality, even fake journals. To avoid this and to guarantee a smooth transition to open access, researchers would like to preserve the main traditional journals which are useful, having a good reputation and good practices.

The wisest solution is the green open access model!

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