Publishing and peer-reviewing in open access

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Research and Innovation Center, OpenAIRE,
Athens

Principle

Ideas are not of the same nature as material products,
since when you give an idea you do not lose it.
Therefore, knowledge is not a product to be traded,
but a commons to be shared,
for exchange of ideas is a positive-sum game.

Charlotte Hess and Elinor Ostrom,
Understanding knowledge as a Commons,
MIT Press, 2006

In 2009 Elinor Ostrom got the Nobel prize in economic sciences
for 'her analysis of economic gouvernance,
especially the commons, showing how
common resources can be managed successfully
by the people who use them, rather than
by governments or private companies'.

Elinor Ostrom (1933-2012)

She was professor of political science
at Indiana University (USA)
and the only woman
who has ever received the
Nobel prize in economic sciences.

What publishing is for?

Research is a collaborative endeavour, in both space and time,
that advances through discussions, seminars, conferences
and the publication of peer-reviewed articles.

Publishing means making the research outputs publicly available.
Peer reviewing means checking the content of articles by peers
(to find errors, assess results' originality and improve presentation).

Peers are researchers in activity (not employees of publishers).

$$\Longrightarrow$$
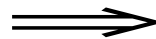
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of research outputs for the advancement of knowledge.
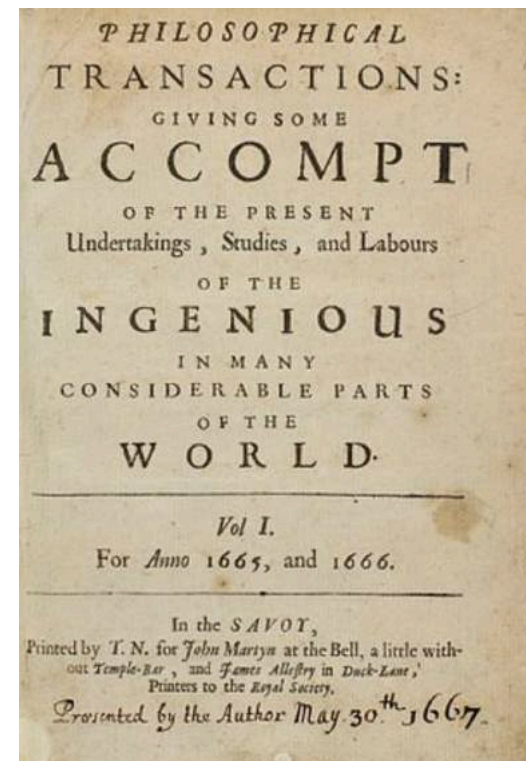
Peer-reviewed scholarly journals

The publication of research outputs in peer-reviewed journals
is the backbone of the present research system.
It was founded on *January 5th 1665* for sharing ideas and results.
It is also used today for evaluating researchers and projects.
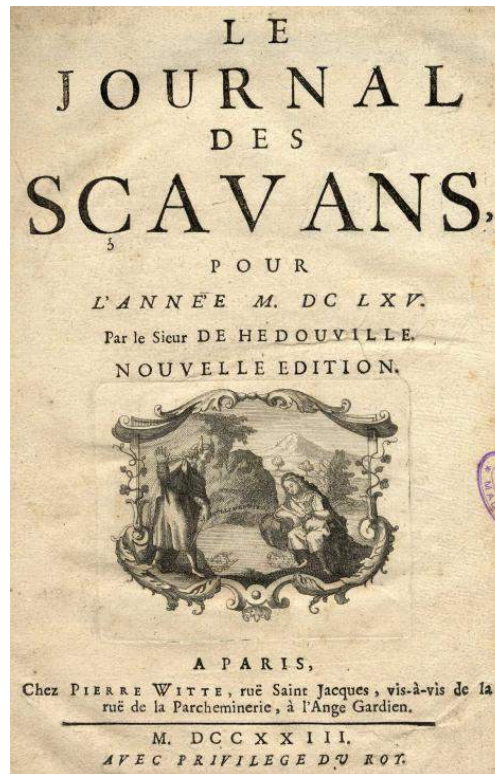
Paris, 5th January 1665

London, 6th March 1665

How are we peer-reviewing and publishing today?

Business model of peer-reviewed journals

Researchers acting as editors

Researchers write articles, typeset them in final format, review those of their peers, are editors of scholarly journals.

Publishers

After papers are accepted by reviewers and editors, publishers put them online, insure their visibility, occasionally print them, and sell them.

Taxpayers

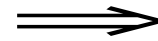Their salaries are paid by taxpayers

Librarians negociate subscription contracts, pay them, control access to the journals and curate collections of articles.

Publishers own articles, journals and more…

Profit margin up to 40% !

Before publishing the accepted papers, publishers require that researchers transfer them their copyrights for free!

⟹

Publishers own intellectual property of the text, figures and data contained in articles for more than 100 years. They can thus sell articles at the prices and conditions they set, with non-disclosable contracts.

Publishers also own the scholarly journals, plus all derivatives (*e.g.*, databases), plus the peer-reviewing and publishing plaftforms, and the bibliometric data used to evaluate research projects and researchers' career

Authors must give their copyrights for free !

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Author(s):	Teluo Sakurai, Katsunori Yoshimatsu, Kai Schneider, Marie Farge, Koji Morishita, Takashi Ishihara
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Teluo Sakurai, Katsunori Yoshimatsu ✉, Kai Schneider ✉, Marie Farge, Koji Morishita & Takashi Ishihara

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We, the authors, and anyone else, have to pay 82 € to the publisher to buy the right to read our article online during 30 days only !

Who has access to peer-reviewed articles ?

Only researchers working in institutions and countries rich enough
to afford the very costly subscriptions to scholarly journals.

Researchers working for companies or in poor institutions,
teachers, students, retired researchers and all citizens who finance
public research do not have access to most of the scholarly articles.

By 2000 most of the renown scholarly journals have been bought
by few major publishers, whose exceptional profits rely on the work
that researchers and their funding agencies offer them for free.

Publishers benefit from the digital revolution and the Web to
to reduce production costs using online peer-reviewing and publishing,
but keep the business model designed for printing on paper.

$\Longrightarrow$
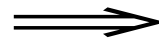
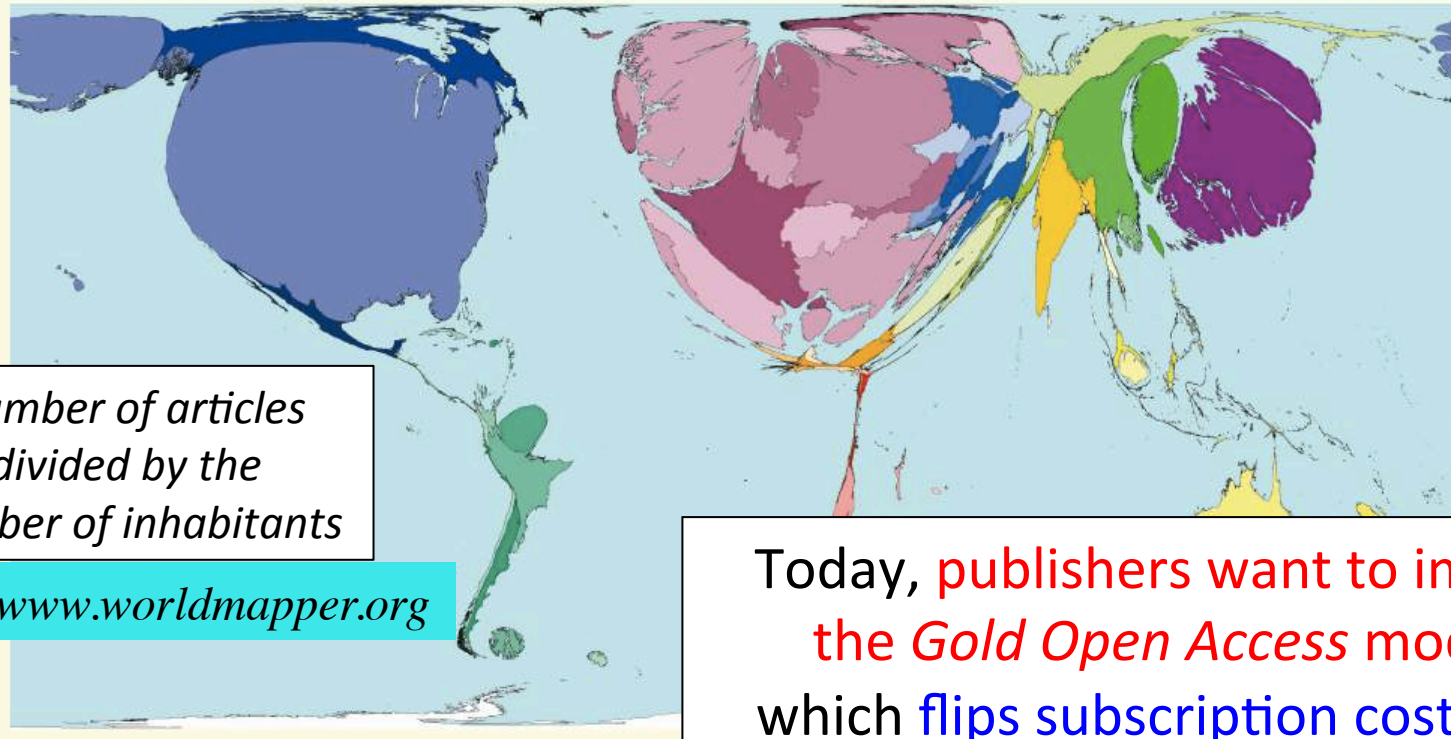Today few major publishers have acquired an oligopolistic position.

Operating profits and profit margin of the publisher *Reed-Elsevier*
for its Scientific, Technical and Medical (STM) division from 1990 to 2015
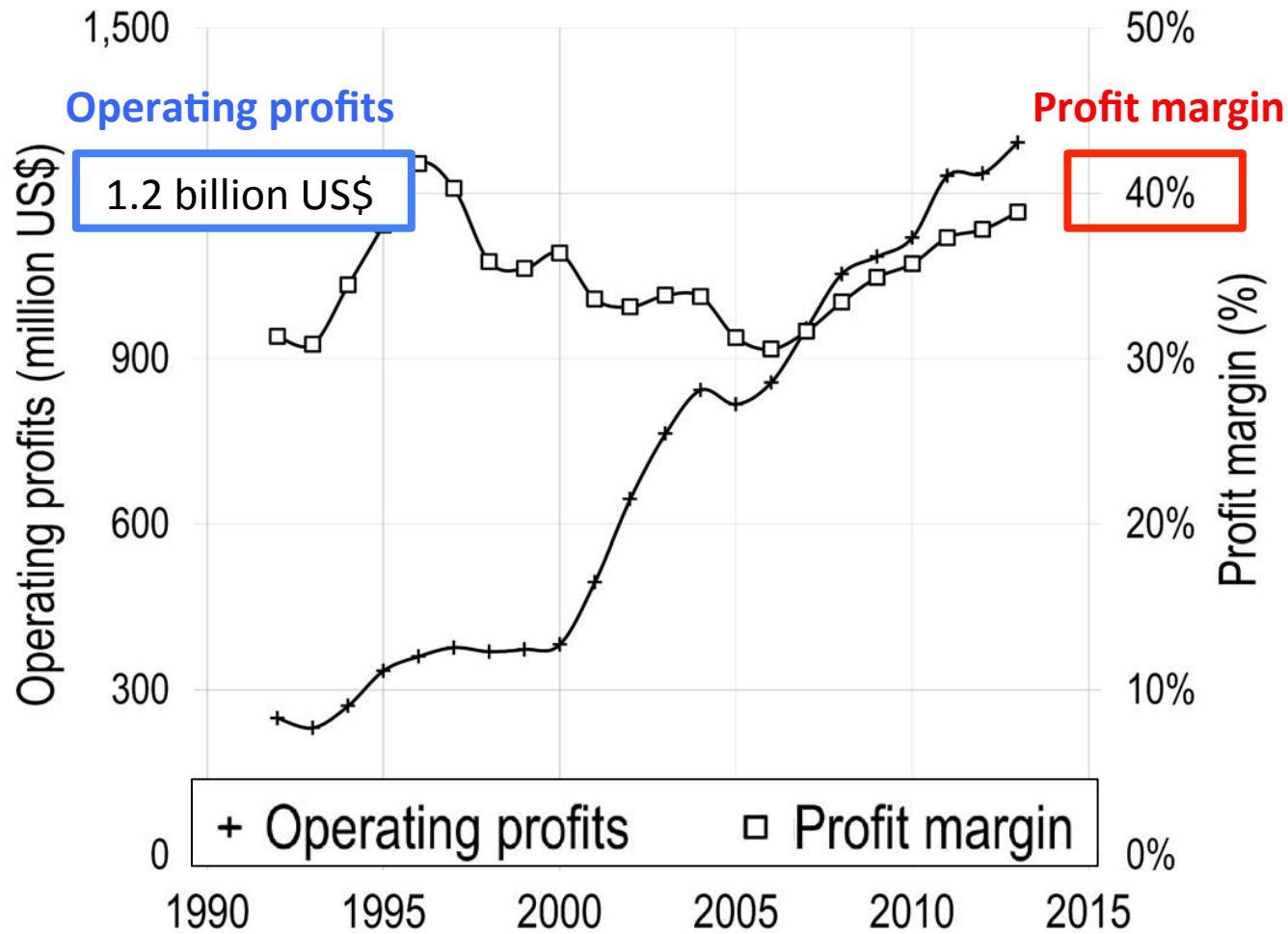
Vincent Larivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015

Density of peer-reviewed articles per country

Number of articles
divided by the
number of inhabitants

http://www.worldmapper.org

1 →	1 →	1 →	Centre National de la Recherche Scientifique*
2 →	1 →	1 →	Chinese Academy of Sciences*
3 →	1 →	1 →	Russian Academy of Sciences*
4 →	1 →	1 →	Harvard University
5 →	2 →	1 →	Helmholtz Gemeinschaft*
6 →	3 →	2 →	Max Planck Gesellschaft*
7 →	2 →	1 →	University of Tokyo

http://www.scimagoir.com

Today, publishers want to impose
the *Gold Open Access* model,
which flips subscription costs into
Article Processing Charges (APCs)
that researchers pay them to publish

⟹
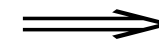
Gold OA is counter-productive since
researchers would no more publish
or their institutions get bankrupted!

Which publishing system
might benefit to researchers
rather than to publishers?

What do we need publishers for ?

'Since the creation of scientific journals 350 years ago, large commercial publishing houses have increased their control of the science system. While one could argue that their role of typesetting, printing, and diffusion were central in the print world, the ease with which these functions can be fulfilled in the electronic world makes one wonder: what do we need publishers for? [...] It is up to the scientific community to change the system in a similar fashion and in parallel to the open access and open science movements. Unfortunately, researchers are still dependent on one essentially symbolic function of publishers, which is to allocate academic capital, thereby explaining why the scientific community is so dependent on *The Most Profitable Obsolete Technology in History* '

The Cost of Knowledge, 2012

Tim Gowers and 33 mathematician colleagues called to boycott *Elsevier* and thus stopped the *Research Works Act*, a bill to the US Congress *Elsevier* was lobbying for.

Sir Tim Gowers,
Cambridge University,
Fields medal 1998

16556 Researchers Taking a Stand. <u>See the list</u>

Academics have protested against Elsevier's business practices for years with little effect. These are some of their objections:

1. They charge exorbitantly high prices for subscriptions to individual journals.

2. In the light of these high prices, the only realistic option for many libraries is to agree to buy very large "bundles", which will include many journals that those libraries do not actually want. Elsevier thus makes huge profits by exploiting the fact that some of their journals are essential.

3. They support measures such as SOPA, PIPA and the ~~Research Works Act~~, that aim to restrict the free exchange of information.

http://www.thecostofknowledge.com/

Researchers want to recover control

`Neither author nor reader should have to pay to publish and
a journal should not belong to its publisher but to its editorial board.
The publishing of peer-reviewed articles should be done using
public infrastructures from where articles are accessible online for free.'

Marie Farge, Note for the French Minister of Research, June 29th 2012
http://openscience.ens.fr/MARIE_FARGE/

CoK have proposed
the alternative model
Diamond Open Access

*Diamond Sutra,
the earliest complete survival
of a dated printed book,
China, 11th May 868*

British Library, London

Diamond Open Access

1

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2

Editors of a peer-reviewed journal collectively own its title and assets,
since they are in charge of peer-reviewing the submitted articles
(editors and referees do this for free, as part of their academic duty).

3

Publishers no more own the peer-reviewed journals
but provide services their editors
(that select them on a competitive basis).

# Examples of Diamond OA journals

1

IPOL Journal · Image Processing On Line

Founded in 2010 by Jean-Michel Morel, IPOL has 41 editors.
It is financed by CNES, ERC and 13 public institutions from 5 countries.
Each article contains the text, the algorithm and the source code,
which all are peer reviewed. The journal platform also provides
online demonstration facility and an archive of experiments.
IPOL thus ensures open science and reproducible research.

2

Discrete Analysis
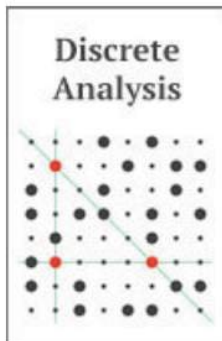
Founded in 2015 by Tim Gowers, DA has 12 editors.
It is an overlay journal on the open repository arXiv.
It is financed by Cambridge University (10$/submission).

We need public publishing platforms

Funding agencies should provide, for free to researchers,
publicly-owned platforms, developed using open source software,
for peer-reviewing, publishing and archiving articles and data,
with the help of librarians and of publishers (as subcontractors).

Anyone from anywhere would have free (gratis and libre) access to
peer-reviewed publications (*e.g.*, articles, data, codes, videos)
without researchers having to pay to publish their results.

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

Such publishing platforms would give the chance to researchers
to experiment new ways of publishing (*e.g.*, open peer-reviewing).

Examples of public publishing platforms

Brasil
+
África do Sul
Argentina
Brasil
Chile
Colômbia
Costa Rica
Cuba
Espanha
México
Peru
Portugal
Venezuela
+
Bolívia
Paraguai
Uruguai

SciELO
Scientific Electronic Library Online

Created in 1999,
it publishes
1249 journals
in open access,
financed by public
agencies from Brazil
(FAPESP, CNPq,
BIREME) and from
15 other countries.

revues.org
CENTRE POUR L'ÉDITION ÉLECTRONIQUE OUVERTE
CENTRE FOR OPEN ELECTRONIC PUBLISHING

Created in 1999,
it publishes
451 journals
in open access,
financed by public
agencies from France
(CNRS, EHESS, BSN,
Aix-Marseille and
Avignon universities).

How to insure a smooth transition from printing on paper to online publishing?

Green Open Access

Today, publishers own journals, together with bibliometry data,
that they use as marketing tools to control market,
and impose Gold OA to keep control of prices (*e.g.*, APCs),
which leads to the creation of predatory journals.

Today, researchers want to preserve journals useful to them
(those having good reputation and excellent practices),
therefore they submit their articles to those they prefer,
and deposit the « author's version » in a public open repository.

$$\Longrightarrow$$
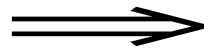
Green OA is the wisest solution for a smooth transition to OA,
since it preserves academic freedom and prepare Diamond OA.

http://openscience.ens.fr/MARIE_FARGE

Dissemin, a platform to boost Green OA

In September 2014 Antonin Delpeuch created ***http://dissem.in***
(he was then student in computer sciences at ENS Paris),
which is collectively developed in open source.

'Spot your own paywalled papers.
Liberate them in one click!'

The team *CAPSH / Dissemin*

http://dissem.in is supported by the non profit association CAPSH
(Committee for the Accessibility of Publications in Sciences and Humanities)
created on *September 5ᵗʰ 2015* by :

Antonin Delpeuch
Graduate student, Computer Science
École Normale Supérieure
France

Creator and main developer
of the platform *Dissemin*

"We need to take a stand against more traditional publishers"

SPARC Europe

Europe's Open Access Champion 2016
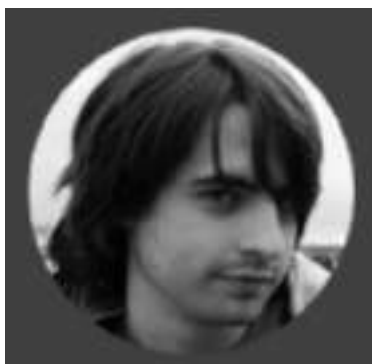
Antoine Amarilli   Pablo Rauzy   Marie Farge   Thomas Bourgeat

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Green open access

Many researchers do not use their right to make their papers freely available online, in addition to the paywalled version offered by traditional publishers.

This forces libraries to buy overpriced electronic subscriptions to journals, when they can afford them at all.

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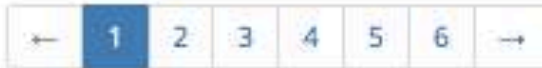hello@dissem.in
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↓ Download | American Meteorological Society, Journal of the Atmospheric Sciences, 2016.

Frank G. Jacobitz, **Kai Schneider**, Wouter J. T. Bos, **Marie Farge**

Structure of sheared and rotating turbulence: Multiscale statistics of Lagrangian and Eulerian accelerations and passive scalar dynamics

↓ Download | American Physical Society, Physical Review E, 1(93), 2016.

2015

Marie Farge, Kai Schneider

Wavelet transforms and their applications to MHD and plasma turbulence: a review

↓ Download | Cambridge University Press (CUP), Journal of Plasma Physics, 06(81), 2015.

Researcher

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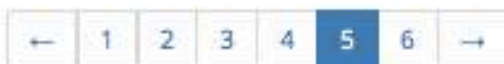- 🟦 Publisher forbids sharing 2

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

⬆ Upload | 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

⬆ Upload | Springer Verlag, *Notes on Numerical Fluid Mechanics and Multidisciplinary Design*, 2003.

2002

Bartosz Protas, Kai Schneider, **Marie Farge**

Geometrical alignment properties in Fourier- and wavelet-filtered statistically stationary two-dimensional turbulence

⬆ Upload | Physical Review E, 4(66), 2002.

Kai Schneider, **Marie Farge**

Adaptive Wavelet Simulation of a Flow around an Impulsively Started Cylinder Using Penalisation

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

Journal article by Marie Farge, Kai Schneider, Giulio Pellegrino, Alan A. Wray, Robert S. Rogallo

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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%N 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%N wavelet modes correspond to a 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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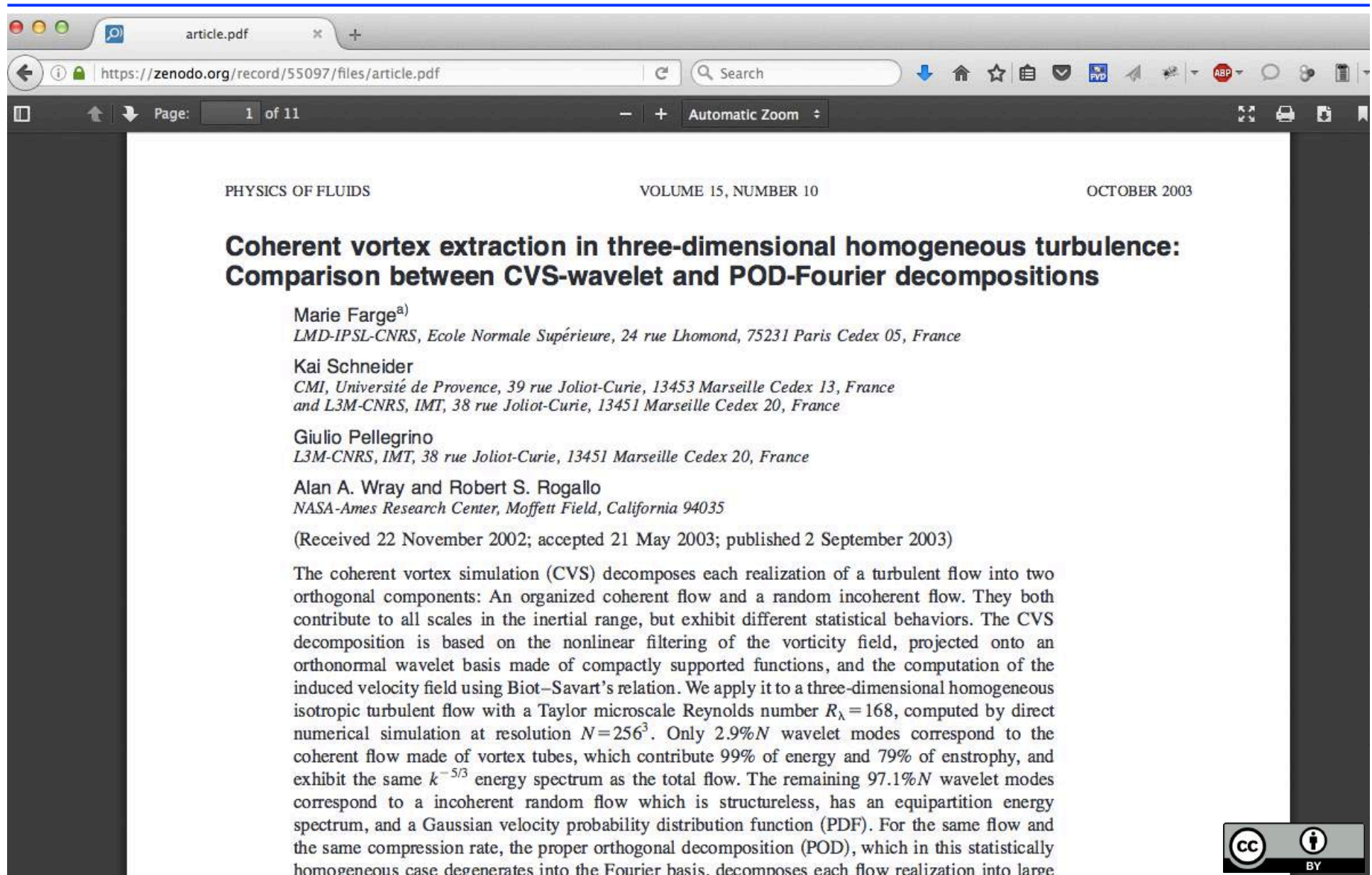
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Abstract

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%N 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%N wavelet modes correspond to a 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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Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

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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 $2.9\%N$ 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 $97.1\%N$ wavelet modes correspond to a 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

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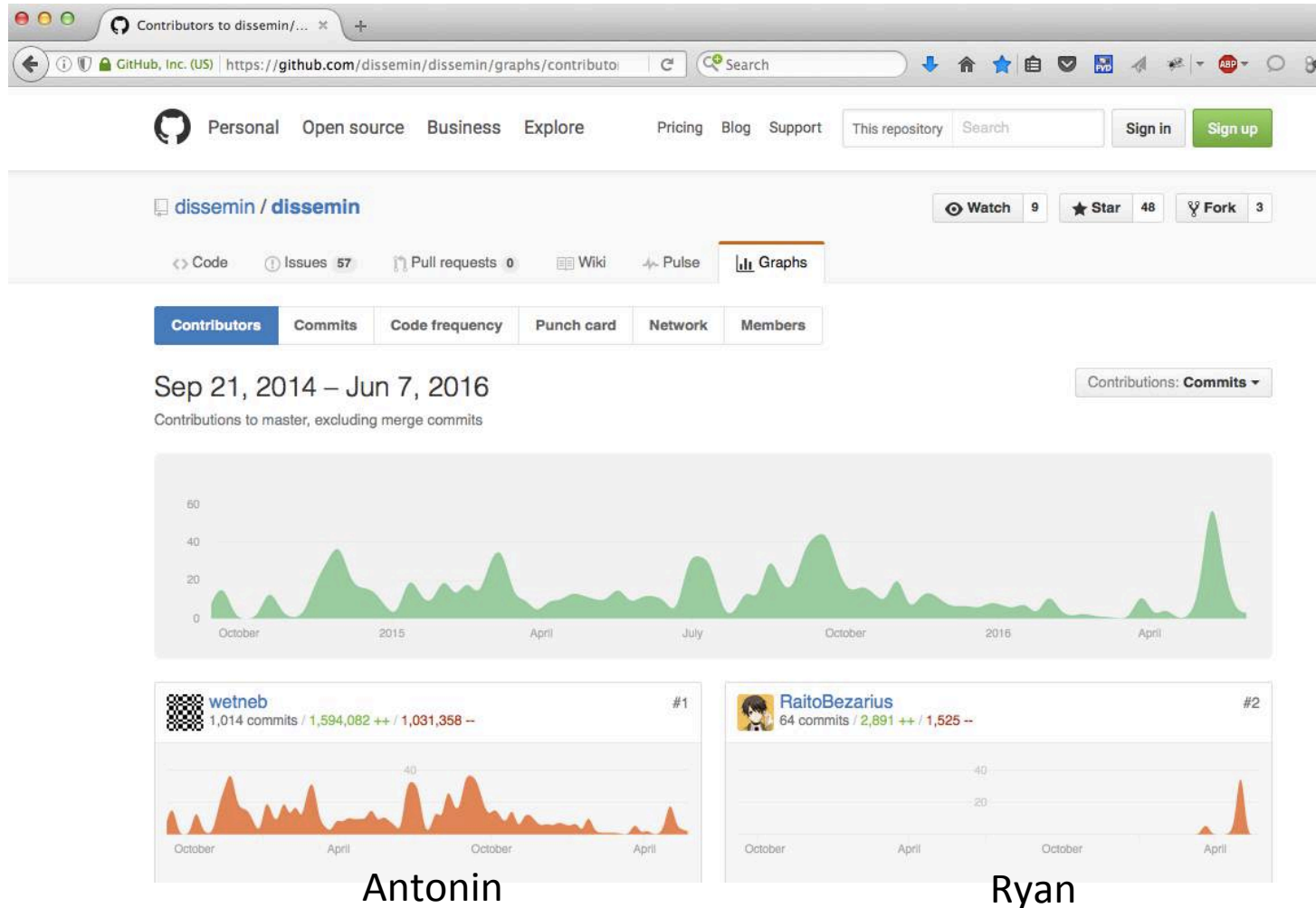
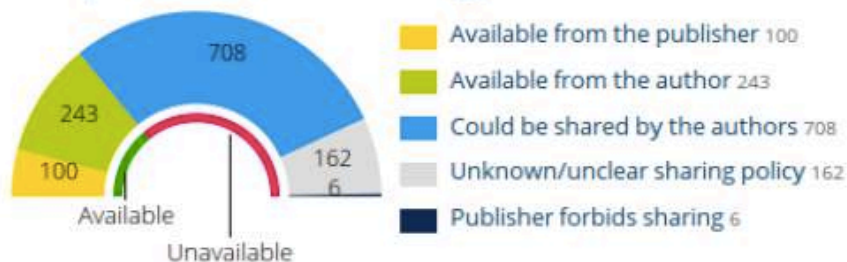You are also welcome to participate to its development in *Python* !
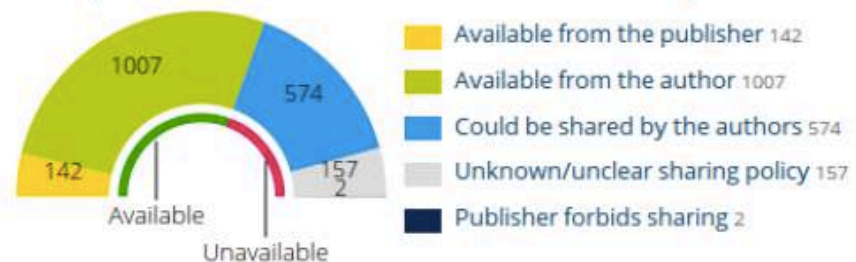
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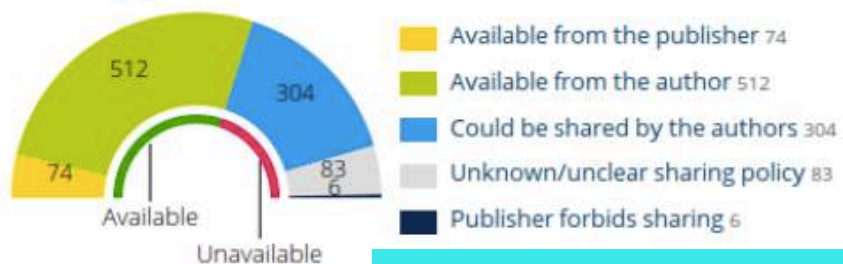
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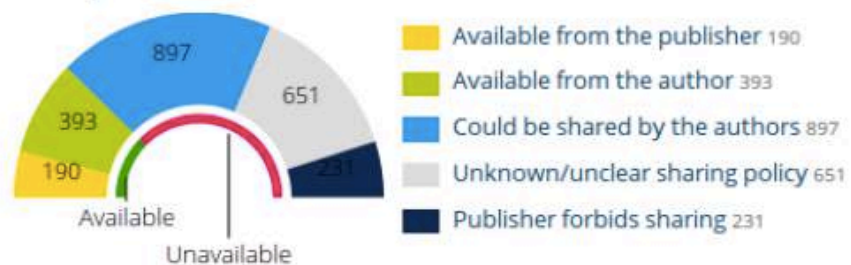
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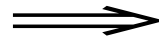
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'Scholarly publishing and peer-reviewing in open access', Marie Farge, 2017
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