

# HAL: THE INTERCONNECTING FRENCH NETWORK INSTITUTIONAL ARCHIVES WITH DISCIPLINARY REPOSITORIES

Bénédicte Kuntziger

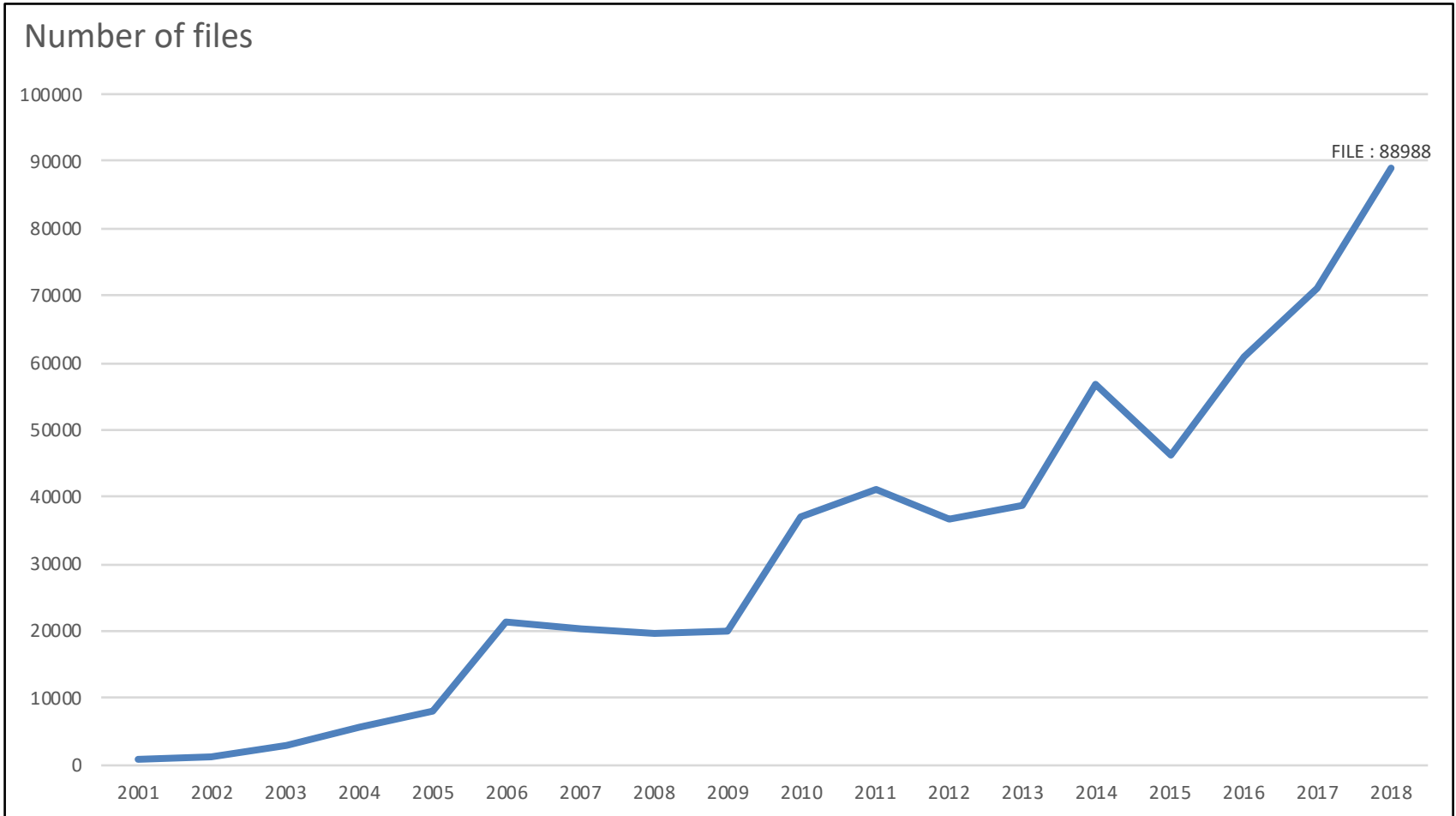
COAR – Lyon, France

May 22, 2019

# OUTLINE

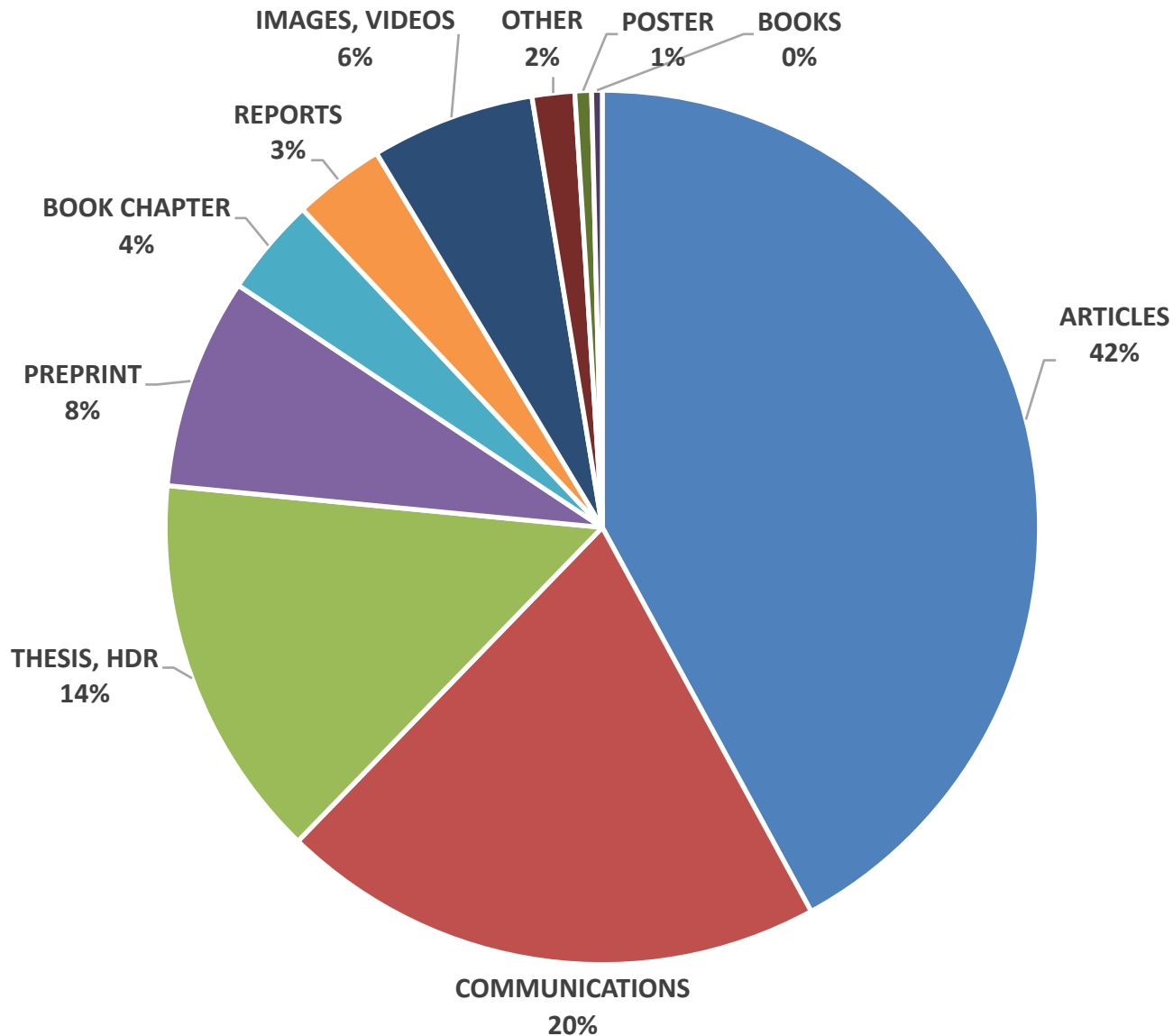
- ▶ Introduction
- ▶ HAL : how does it work? Hal functionalities and services : focus on dissemination and valorisation
- ▶ HAL interoperable and interconnected repository
- ▶ Conclusion : HAL Ecosystem

# HAL = 588.000 DOCUMENTS (FILES)



NUMBER OF  
SUBMISSIONS (FILES) PER YEAR

# HAL = SEVERAL TYPES OF DOCUMENTS



## Publications

- Journal articles
- Conference papers
- Poster communications
- Books
- Book sections
- Directions of work or proceedings
- Patents
- Other publications

## Documents

- Preprints, Working Papers, ...
- Reports

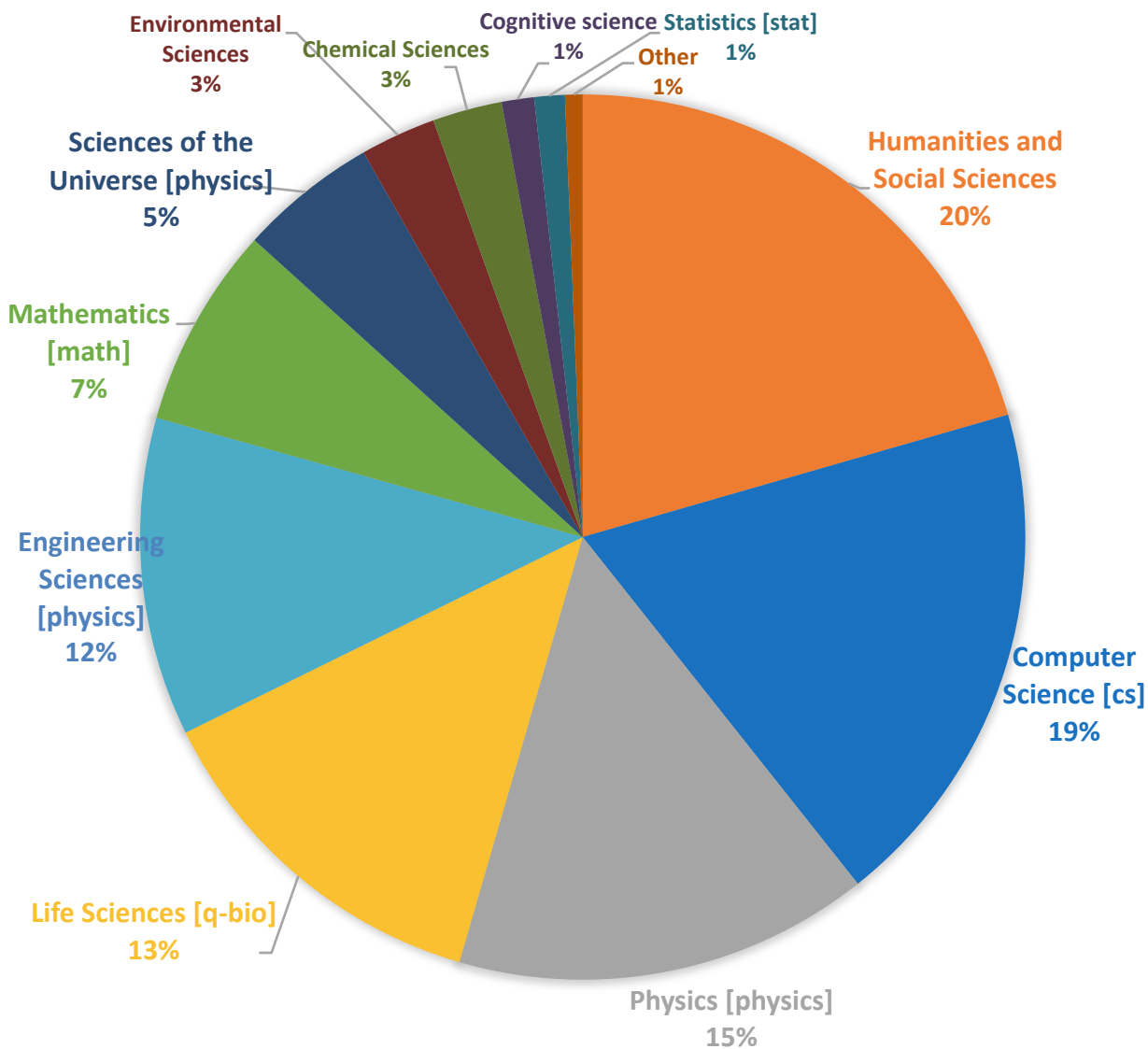
## Academic works

- Theses
- Habilitation à diriger des recherches
- Lectures

## Research data

- Photos
- Videos
- Audios
- Maps
- Software

# HAL = A MULTIDISCIPLINARY CORPUS



- ▶ Chemical Sciences
- ▶ Computer Science [cs]
- ▶ Mathematics [math]
- ▶ Nonlinear Sciences [physics]
- ▶ Physics [physics]
- ▶ Cognitive science
- ▶ Environmental Sciences
- ▼ Sciences of the Universe [physics]
  - ▼ Astrophysics [astro-ph]
    - Cosmology and Extra-Galactic Astrophysics [astro-ph.CO]
    - Earth and Planetary Astrophysics [astro-ph.EP]
    - Galactic Astrophysics [astro-ph.GA]
    - High Energy Astrophysical Phenomena [astro-ph.HE]
    - Instrumentation and Methods for Astrophysics [astro-ph.IM]
    - Solar and Stellar Astrophysics [astro-ph.SR]
  - Continental interfaces, environment
  - Ocean, Atmosphere
  - Other
- ▶ Earth Sciences
- ▶ Life Sciences [q-bio]
- ▼ Humanities and Social Sciences
  - Biological anthropology
  - Social Anthropology and ethnology
  - Archaeology and Prehistory
  - Architecture, space management
  - Art and art history
  - Classical studies
  - Demography
  - Law
  - Economies and finances
  - Education
  - Environmental studies
  - Gender studies
  - Geography
  - Business administration
  - History, Philosophy and Sociology of Sciences
  - History
  - Library and information sciences
  - Linguistics
  - Literature
  - Cultural heritage and museology
  - Musicology and performing arts

# OUTLINE

- ▶ Introduction
- ▶ **HAL : how does it work? Hal functionalities and services : focus on dissemination and valorisation**
- ▶ HAL interoperable and interconnected repository
- ▶ Conclusion : HAL Ecosystem

# HAL INTERFACE

The screenshot displays the HAL website interface. At the top, there is a navigation bar with the CCSD logo, a 'HAL' dropdown menu, and links to 'Episciences.org', 'Sciencesconf.org', and 'Support'. On the right side of the navigation bar, there are language options for 'fr' and 'en', and a user profile for 'Bénédicte Kuntziger'. Below the navigation bar is a dark blue banner featuring the HAL logo and the text 'archives-ouvertes.fr'. To the right of the logo is an illustration of a stylized figure holding an open book, surrounded by various mathematical symbols like pi, infinity, and numbers. Below the banner is a horizontal menu with links for 'Home', 'Submit', 'Browse', 'Search', 'Documentation', and 'My space'. The main content area is divided into two columns. The left column contains the heading 'The open archive HAL' and a paragraph stating that HAL is an open archive for scholarly documents. Below this, there are two sections: 'For the attention of the authors' with a list of three bullet points regarding deposit policies, and 'For the attention of the readers' with a single bullet point about intellectual property rights. At the bottom of the left column is a section titled 'LATEST SUBMISSIONS IN HAL' with a list of three recent publications. The right column contains three statistics boxes: 'SEARCH' with a search input field, 'NUMBER OF RESOURCES' showing '1 779 279', and 'NUMBER OF FULLTEXTS' showing '584 387'. At the bottom of the right column is a 'NEWS' section with two news items: 'PUBLISHERS ALLOWING AAM ("POSTPRINT") POSTING TO REPOSITORIES WITHOUT EMBARGO' and 'INVESTIGATING YOUR PUBLISHING AND OPEN ACCESS PRACTICES'.

CCSD HAL Episciences.org Sciencesconf.org Support fr en Bénédicte Kuntziger

**HAL**  
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Home Submit Browse Search Documentation My space

Home

## The open archive HAL

HAL is an open archive where authors can deposit scholarly documents from all academic fields.

**For the attention of the authors**

- The deposit of the fulltext should be made in agreement with the co-authors and in the respect for the policy of the publishers.
- The deposit is subject of a control, HAL reserves the right to refuse items that do not meet the criteria of the archive.
- Any deposit is definitive, no withdrawals will be made after the on-line posting of the publication.
- Text files in pdf format or image files are sent to CINES for long-term archiving.

**For the attention of the readers**

- In a context of electronic distribution, each author keeps their intellectual property rights.

**LATEST SUBMISSIONS IN HAL**

- Mohamed El Boudani. Suivi non destructif de l'altération de marbres par méthodes acoustiques. Mécanique des matériaux [physics.class-ph]. Université de Cergy Pontoise, 2017. Français. (NNT : 2017CERG0947). (tel-02118867)
- Daichi Kashino, John Silverman, David Sanders, Jeyhan Kartaltepe, Emanuele Daddi, et al.. The FMOS-COSMOS Survey of Star-forming Galaxies at  $z \sim 1.6$ . VI. Redshift and Emission-line Catalog and Basic Properties of Star-forming Galaxies. Astrophysical Journal Supplement, American Astronomical Society, 2019, 241 (1), pp.10. (10.3847/1538-4365/ab06c4). (hal-02110856)
- G. Wisocq, J. Rousseau, Pierre Sagaut. Investigating the stability of the LBM-RCK through an extended von Neumann

**SEARCH**

Termes de recherche (\* pour tous)

**NUMBER OF RESOURCES**

1 779 279

**NUMBER OF FULLTEXTS**

584 387

**NEWS**

**PUBLISHERS ALLOWING AAM ("POSTPRINT") POSTING TO REPOSITORIES WITHOUT EMBARGO** (5/3/19)

**INVESTIGATING YOUR PUBLISHING AND OPEN ACCESS PRACTICES** (12/2/19)

# AURÉHAL : MANAGING SHARED AUTHORITIES

## Domains

HAL-SHS Portal  
Collection

## Author

IdHal,  
Personal page

## Research Structures

Institutional Portals  
Laboratories  
collections

## Journals

Informations via API  
Sherpa/Romeo  
Collection

## ANR Funding

Projects (national)  
Collection

## European Funding Projects

OpenAIRE Referencement  
Collection

### Accès Unifié aux Référentiels HAL

Auteurs
Structures
Domaines
Revues
Projets ANR
Projets européens

#### Liste des référentiels

AURÉHAL permet d'accéder aux référentiels utilisés dans HAL.

Les référentiels disponibles dans AURÉHAL sont les suivants :

- les «formes» auteurs
- les structures de recherche
- les disciplines
- les revues
- les projets ANR
- les projets européens

#### Conditions d'utilisation

Aucune inscription dans HAL n'est nécessaire pour consulter les référentiels de HAL.

Tout ajout et modification dans les référentiels nécessite d'être inscrit dans HAL et d'avoir les droits afférents.

Les référentiels de HAL peuvent être consultés de façon totale ou partielle dans le respect du code de la propriété intellectuelle.

Pas d'utilisation commerciale des données extraites.

**Creation**  
Submission  
Portal Administrator  
Importation

**Curation**  
Author (idHAL)  
Portal administrator

### Connection to other Identifiers

Authors Identifiers (*IdRef*, *Orcid*, *ResearcherId*,...)  
Research structures Identifiers (*RNSR*)





hal-00107064, version 8

# Cellular Computing and Least Squares for partial differential problems parallel solving

**Nicolas Fressengeas** AuthorId : 99879

Correspondent author

- IdHAL : fresseng
- Researcherid : http://www.researcherid.com/rid/B-9982-2012
- ORCID : https://orcid.org/0000-0002-5534-712X

**Hervé Frezza-Buet** AuthorId : 1006848

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- IdHAL : herve-frezza-buet

**1** LMOPS - Laboratoire Matériaux Optiques, Photonique et Systèmes (Université de Lorraine - CentraleSupélec, 2 rue Edouard Belin, 57070 Metz - France) StructId : 202503

- CentraleSupélec (3, rue Joliot Curie, Plateau de Moulon, 91192 GIF-SUR-YVETTE Cedex - France) StructId : 411575
- UL - Université de Lorraine : EA4423 (34 cours Léopold - CS 25233 - 54052 Nancy cedex - France) StructId : 413289

**2** Information, Multimodality and Signal (France) StructId : 393047

- SUPELEC-Campus Metz (2 rue Edouard Belin 57070 Metz - France) StructId : 26305
  - SUPELEC (France) StructId : 300812

Hide details

**Abstract :** This paper shows how partial differential problems can be solved thanks to cellular computing and an adaptation of the Least Squares Finite Elements Method. As cellular computing can be implemented on distributed parallel architectures, this method allows the distribution of a resource demanding differential problem over a computer network.

**Keywords :** Least Squares Partial Differential Systems Cellular Computing Formal computing

**Document type :** Journal articles

**Domain :**

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- Mathematics [math] / Mathematical Physics [math-ph]
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## IDENTIFIERS

- DOCID : 451475
- HAL Id : hal-00107064, version 8
- ARXIV : math-ph/0610037

## COLLECTIONS

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## CITATION

Nicolas Fressengeas, Hervé Frezza-Buet. Cellular Computing and Least Squares for partial differential problems parallel solving. *Journal of Cellular Automata*, Old City Publishing, 2014, 9 (1), pp.1-21. (hal-00107064v8)

## EXPORT

BibTeX TEI DC DCterms EndNote

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## METRICS

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**Nicolas Fressengeas** AMMOR 59879

Correspondent author

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- ResearcherId : <http://www.researcherid.com/rid/B-9982-2012>
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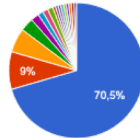
**Domain** : Physics [physics] / Mathematical Physics [math] / Mathematics [math] / Mathematical Physics [math] / Mathematics [math] / Analysis of PDEs [math.AP] / Computer Science [cs] / Distributed, Parallel, and Emergent Computing [cs.DG]

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### DOMAINS



### KEYWORDS

Mirror Sub-wavelength grating VCSEL  
Robust design RCWA Schottky Design  
Photorefractive Mid infrared  
Photorefractive effect Defects  
Solar cell High contrast grating mirror  
Self-focusing soliton Self focusing  
Simulation InGaN Fine grained parallel  
models Optimization

### CO-AUTHORS

- Delphine Wolfersberger 72
- Godefroy Kugel 42
- Cristian Dan 26
- Naima Khelfaoul 24
- Jean Maufroy 21
- Frédéric Genty 18
- Sidi Ould Saad Hamady 18
- Christyves Chevallier 17
- Hervé Leblond 16
- Joël Jacquet 15

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- IdHAL : [fresseng](#)
- ORCID : [0000-0002-5534-712X](https://orcid.org/0000-0002-5534-712X)
- ResearcherId : [B-9982-2012](http://www.researcherid.com/rid/B-9982-2012)

### SOCIAL NETWORKS

- [Twitter](#)

## Full professor Nicolas Fressengeas

Number of documents

156

Lorraine university full professor

- Head of the [Optical Materials and Photonic Systems Laboratory \(LMOPS\)](#)
- Missionned for "Open Science" the Lorraine university

Details and opinions in French :

- Science and teaching blog : <http://fressengeas.net>
- Tweeting about science, teaching, and freedom : [@fresseng](#)
- [LinkedIn Details](#)

### JOURNAL ARTICLES

44 documents

Sidi Ould Saad Hamady, Nicolas Fressengeas. SLALOM: Open-source, portable, and easy-to-use solar cell optimizer. Application to the design of InGaN solar cells. *EPJ Photovoltaics*, EDP sciences, 2018, 9, pp.13. [10.1051/epjpv/2018011](https://hal.archives-ouvertes.fr/hal-01964575). [\(hal-01964575\)](#)

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Sidi Ould Saad Hamady, Abdoulwahab Adaine, Nicolas Fressengeas. Numerical simulation of InGaN Schottky solar cell . *Materials Science in Semiconductor Processing*, Elsevier, 2016, 41, pp.219-225. <http://www.sciencedirect.com/science/article/pii/S1369800115301797>. [10.1016/j.mssp.2015.09.001](#). [\(hal-01256060\)](#)

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Nicolas Fressengeas, Hervé Frezza-Buet. Cellular Computing and Least Squares for partial differential problems parallel solving. *Journal of Cellular Automata*, Old City Publishing, 2014, 9 (1), pp.1-21. [hal-00107064v8](https://hal.archives-ouvertes.fr/hal-00107064v8)

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Christyves Chevallier, Frédéric Genty, Nicolas Fressengeas, Joel Jacquet. Robust Design by Antioptimization for Parameter Tolerant GaAs/AlOx High Contrast Grating Mirror for VCSEL Application. *Journal of Lightwave Technology*, Institute of Electrical and Electronics Engineers (IEEE)/Optical Society of America(OSA), 2013, 31 (21), pp.3374-3380. [10.1109/JLT.2013.2282871](https://hal.archives-ouvertes.fr/hal-00870878). [\(hal-00870878\)](#)

Nicolas Fressengeas, Cristian Dan, Delphine Wolfersberger. Microsecond infrared beam bending in photorefractive iron doped indium phosphide. *Optics and Laser Technology*, Elsevier, 2013, 48, pp.96-101. [10.1016/j.optlastec.2012.09.018](https://hal.archives-ouvertes.fr/hal-00751970). [\(hal-00751970\)](#)



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# Cellular Computing and Least Squares for partial differential problems parallel solving

**Nicolas Fressengeas**<sup>1</sup> **Authorid : 528679**  
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— IdHAL : herve-frezza-buet

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  - UL - Université de Lorraine : EA4423 (34 cours Léopold - CS 25233 - 54052 Nancy cedex - France) **StructId : 413289**

- 2** Information, Multimodality and Signal (France) **StructId : 393047**
  - SUPELEC-Campus Metz (2 rue Edouard Belin 57070 Metz - France) **StructId : 26305**
    - SUPELEC (France) **StructId : 300812**

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**Document type :** Journal articles

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Computer Science [cs] / Distributed, Parallel, and Cluster Computing [cs.DC]

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## IDENTIFIERS

- DOCID : 451475
- HAL Id : hal-00107064, version 8
- ARXIV : math-ph/0610037

## COLLECTIONS

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# Cellular Computing and Least Squares for partial differential problems parallel solving

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## Optical materials, photonics and systems laboratory

The **optical materials, photonics and systems laboratory** (LMOPS)<sup>[1]</sup> gathers researchers from **Lorraine university**<sup>[2]</sup> and from **CentraleSupélec**<sup>[3], [4]</sup> in the cities of **Metz, Saint-Avold** and **Thionville**. The research themes lie in the fields of materials in general and optical materials more specifically, non linear optics, optical sensors and photovoltaics. Almost 30 researchers are working in the laboratory, side by side with roughly the same number of PhD students. The LMOPS was created in the year 2000, building from its ancestor, the **Laboratoire Matériaux optiques à propriétés spécifiques**,<sup>[5]</sup> which belonged to the **Metz university**, which teamed with **Supélec** in 2000.

### Whereabouts

The LMOPS laboratory is spread over 4 cities:<sup>[1]</sup>

- Its central part is situated in the **Technopôle de Metz** within the **Metz** campus of **CentraleSupélec**
- A second site in **Metz** is hosted by the **Sciences fondamentales et appliquées Lorraine university unit**, within the Institute for Material Physics and Chemistry
- the **Saint-Avold** site is hosted by the **Institut universitaire de technologie de Moselle-Est**, within the **Lorraine university**
- the **Thionville** site is hosted by the **Institut universitaire de technologie de Thionville-Yutz** within the **Lorraine university**.

### Research teams

The research activities within the LMOPS<sup>[6]</sup> are structured through 4 research teams.<sup>[7]</sup>

- The **Functional Materials** team deals with materials in general, particularly optical materials and polymers
- The **Photonics** team is mainly devoted to non linear optics
- The **Raman sensors & Optical control** team has a strong background in **Raman spectroscopy**
- The **Photovoltaics** team studies materials and systems for the harvesting of solar energy

### Facilities

The LMOPS laboratory can rely on many optical spectrometers. One of the team is specialized in **Raman Spectroscopy** and thus works with many kinds of **Raman** spectrometers. In the laboratory can also be found **absorption spectrometers**, as well as **X fluorescence spectrometers**.

The electrical characterization of materials and devices is also an important aspect of the LMOPS activities. Facilities are available for measuring **current-voltage** curves, as a function of temperature if necessary, for determining the **charge carriers**, and for measuring **capacity-voltage** and **impedance** curves.

Finally, and omitting the many **Laser** sources which are always needed in such a laboratory, the LMOPS can rely on heavy equipment for actual material fabrication, such as ovens using the **Czochralski** process to grow bulk non linear crystals which are to be used for laser frequency doubling, as well as **MOVPE** equipments for the deposition of thin layers of **semi-conductors**. These heavy equipments are completed by a lightweight micro-pulling down crystalline fibre machine.

**Physics [physics] / Mathematical Physics [math-ph]**  
**Mathematics [math] / Mathematical Physics [math-ph]**  
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**Computer Science [cs] / Distributed, Parallel, and Cluster Computing [cs.DC]**

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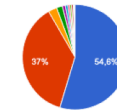
NOMBRE DE DOCUMENTS

147

NOMBRE DE NOTICES

1 315

RÉPARTITION DES DÉPÔTS PAR TYPE DE DOCUMENTS



DERNIERS DÉPÔTS

Jérémy Streque, Thierry Aubert, Ninel Kokanyan, Florian Bartoli, Amine Taguett, et al. **Stoichiometric Lithium Niobate Crystals: Towards Identifiable Wireless Surface Acoustic Wave Sensors Operable up to 600 °C**. *IEEE Sensors Letters*, IEEE, 2019, 3 (4), pp.1-4. (10.1109/LSENS.2019.2908691). (hal-02114799)

Rémy Mangin. **Influence du vieillissement sur le comportement au feu de formulations hétérophasées ignifugées**. *Matériaux*. Université de Lorraine, 2018. Français. (NNT : 2018LORR0216). (tel-02096922)

Cong Xin, Philippe Veber, Mael Guennou, Constance Toulouse, Nathalie Valle, et al. **Single crystal growth of BaZrO3 from the melt at 2700 °C using optical floating zone**

METRICS

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# Cellular Computing and Least Squares for partial differential problems parallel solving

**Nicolas Fressengeas** <sup>1</sup> **Authorid : 528679**

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**Abstract :** This paper shows how partial differential problems can be solved thanks to cellular computing and an adaptation of the Least Squares Finite Elements Method. As cellular computing can be implemented on distributed parallel architectures, this method allows the distribution of a resource demanding differential problem over a computer network.

**Keywords :** Least Squares Partial Differential Systems Cellular Computing Formal computing

**Document type :** Journal articles

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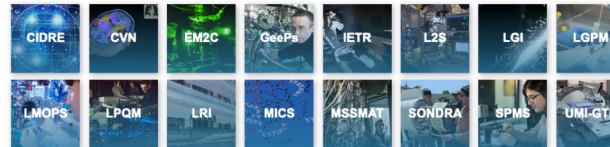
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**Abstract :** This paper shows how partial differential problems can be solved thanks to cellular automata and the Finite Elements Method. As cellular computing can be implemented on distributed architectures, we propose a parallel solving of a resource demanding differential problem over a computer network.

**Keywords :** Least Squares Partial Differential Systems Cellular Computing Formal Calculus

**Document type :** Journal articles

**Domain :** Physics [physics] / Mathematical Physics [math-ph] Mathematics [math] / Mathematical Physics [math-ph] Mathematics [math] / Analysis of PDEs [math.AP] Computer Science [cs] / Distributed, Parallel, and Cluster Computing [cs.DC]

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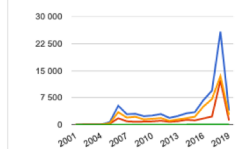
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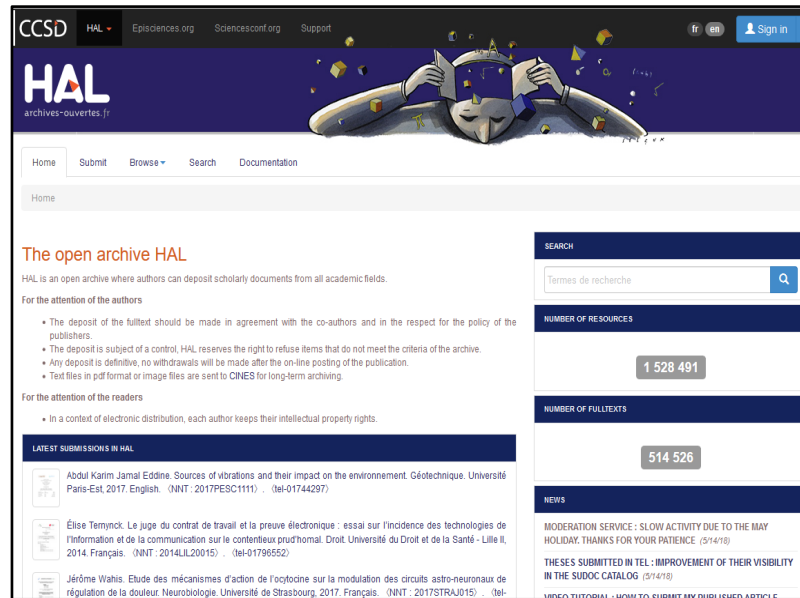
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## Nonlinear optical response of a gold surface in the visible range: A study by two-color sum-frequency generation spectroscopy. II. Model for metal nonlinear susceptibility

Bertrand Busson <sup>1,2</sup>, Laetitia Dalstein <sup>1,3,4</sup> [Details](#)

- 1 LCPO - Laboratoire de Chimie Physique D'Orsay
- 2 INC - Institut de Chimie du CNRS
- 3 Department of Chemistry, School of Chemical Science and Engineering, KTH Royal Institute of Technology
- 4 Institute of Physics, Academia Sinica

**Abstract** : We present a modeling of the nonlinear optical response of a metal surface in order to account for recent experimental results from two-color Sum-Frequency Generation experiments on gold. The model allows calculating the surface and bulk contributions, and explicitly separates free and bound electron terms. Contrary to the other contributions, the perpendicular surface component is strongly model-dependent through the surface electron density profiles. We consider three electron density schemes at the surface, with free and bound electrons overlapping or spilling out of the bulk, for its calculation. The calculated SFG signals from the metal rely only on bulk quantities and do not need an explicit definition of the density profiles. In the particular case of gold, when the free electrons overlap with the bound ones or spill out of the bulk, the free electron response completely dominates through the perpendicular surface terms. When the bound electrons spill out, the situation is more balanced, still in favor of the free electrons, with lower amplitudes and different dispersion lineshapes. As for silver, the free electron contributions dominate, and the calculated slow amplitude growth from blue to red follows the experimental trends.

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[Samer Kayal](#)<sup>7</sup>, [Henrique Veiga-Fernandes](#)<sup>4</sup>, [Claire Danel](#)<sup>1</sup>, [Renato Iozzo](#)<sup>5</sup>, [Hans Kresse](#)<sup>3</sup> and  
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## In vivo selective and distant killing of cancer cells using adenovirus-mediated decorin gene transfer

José Guilherme Tralhão<sup>1</sup>, Liliana Schaefer<sup>2</sup>, Miroslava Micegova<sup>2</sup>, César Evaristo<sup>1</sup>, Elke Schönherr<sup>3</sup>, Samer Kayal<sup>4</sup>, Henrique Veiga-Fernandes<sup>5</sup>, Claire Danel<sup>1</sup>, Renato Iozzo<sup>6</sup>, Hans Kresse<sup>3</sup>, Patricia Lemarchand<sup>7,1,\*</sup> [Details](#)

\* Corresponding author

- 1 Equipe INSERM E0016 - "Développement artériel" [Paris]
- 2 Department of Internal Medicine [Münster, Germany]
- 3 Institute of Physiological Chemistry and Pathobiochemistry [Münster, Germany]
- 4 UPD5 Médecine - Université Paris Descartes - Faculté de Médecine
- 5 Inserm U345 - Différenciation thymique et physiologie des lymphocytes T
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- 7 ITX - unité de recherche de l'institut du thorax UMR1087 UMR6291

**Abstract** : Decorin is a well-known, ubiquitous proteoglycan that is a normal component of the ECM. Upon transgenic expression of decorin, tumor cells with diverse histogenetic background overexpress p21WAF1, a potent inhibitor of cyclin-dependent kinase activity, become arrested in G1, and fail to generate tumors in immunocompromised animals. Because decorin is a secreted protein, it has been recently suggested that decorin could act as an autocrine and paracrine regulator of tumor growth. Here, we demonstrate that adenovirus (Ad)-mediated transfer and expression of human decorin cDNA induced in vivo apoptosis of xenograft tumor cells in nude mice. This oncolytic activity was observed when the Ad vector encoding the decorin cDNA was injected intratumorally (i.t.) or i.v. Importantly, i.t. injection of the decorin Ad vector led to growth inhibition of the injected tumor associated with similar growth inhibition of a distant contralateral tumor, demonstrating a distant decorin antitumoral effect. Immunohistochemistry against human decorin and decorin quantitation in tumors confirmed that decorin migrated to the tumor distant site. Furthermore, decorin effect was specific to tumor cells, because neither apoptosis nor growth inhibition were observed in nontumoral human cells such as hepatocytes, endothelial cells, and fibroblasts, despite p21 overexpression.

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### Role of mechanical morphogenesis in the development and evolution of the neocortex.

Heuer K<sup>1</sup>, Toro R<sup>2</sup>.

Author information

#### Abstract

During the short period of brain development, nature is able to build the only system we know capable of producing cognition, language, creativity, and consciousness. The neocortex - the outermost layer of the mammalian cerebrum - appears to be the biological substrate of these abilities. Its development requires not only the precise placement and wiring of billions of cells, but also the implementation of mechanisms to ensure a viable cognition despite sometimes dramatic perturbations. Today, this remarkably complex organisation is thought to be genetically encoded, and further refined by activity-dependent processes. We propose that mechanical morphogenesis - the capacity of homogeneously growing elastic tissue to produce complex shapes - can also play an important role. Out of homogeneous growth, mechanical morphogenesis can induce the segregation of the neocortex into mechanical and geometric modules - the neocortical folds. Through the feedback of physical forces on developing tissue, these modules can influence the differentiation and wiring of the neocortex, having a causal role on neocortical development, and providing adaptable and robust units for its evolution.

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**KEYWORDS:** Brain development; Brain evolution; Buckling; Mechanical morphogenesis; Neocortical folding

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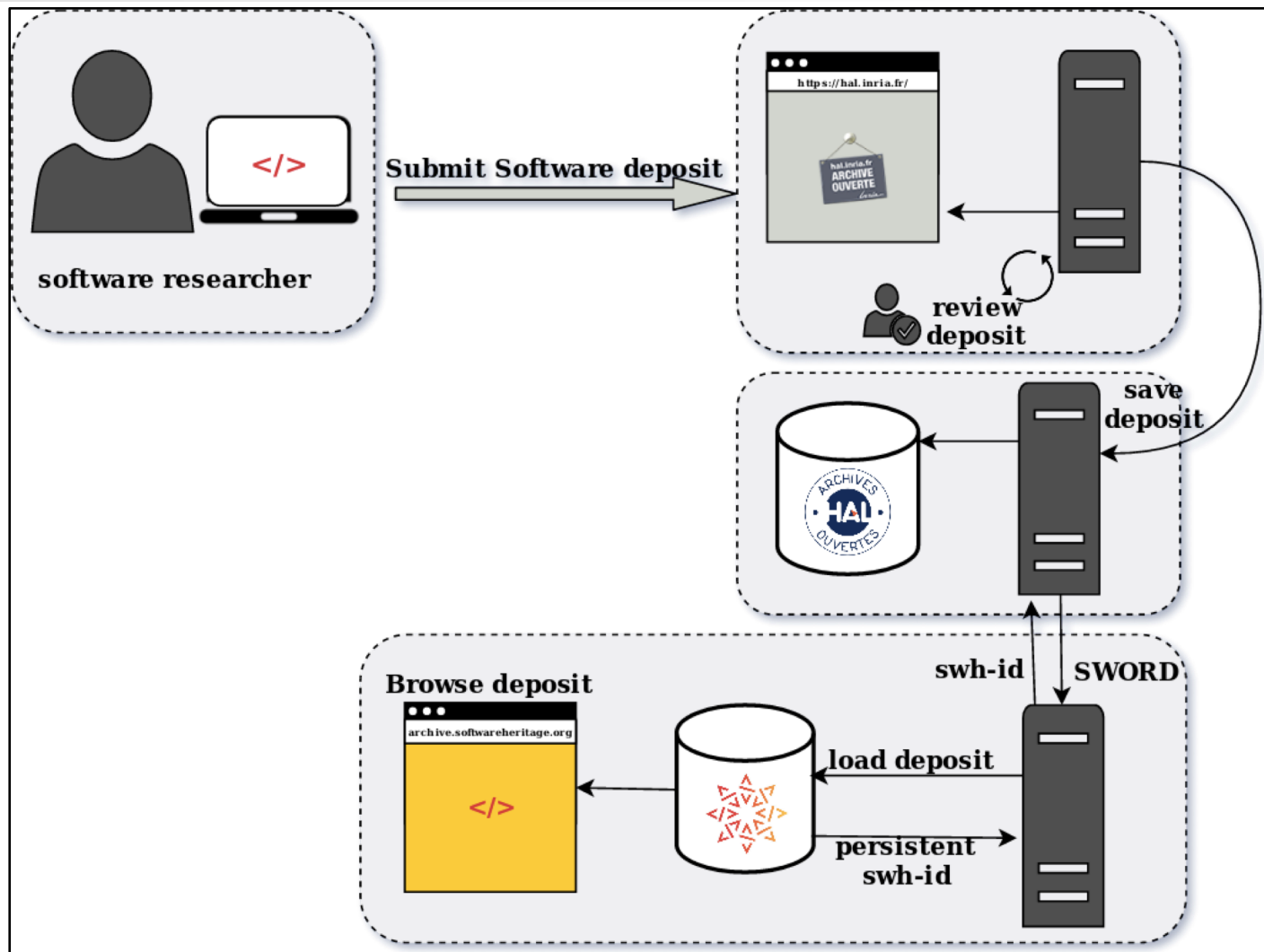
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## Porridge, an OCaml library implementing POR techniques for checking trace equivalence of security protocols

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## Optimal control of a semilinear parabolic equation with singular arcs

Joseph Frederic Bonnans<sup>1, 2</sup> [Details](#)

- 1 Commands - Control, Optimization, Models, Methods and Applications for Nonlinear Dynamical Systems  
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**Abstract** : This paper develops a theory of singular arc, and the corresponding second order necessary and sufficient conditions, for the optimal control of a semilinear parabolic equation with scalar control applied on the r.h.s. We obtain in particular an extension of Kelley's condition, and the characterization of a quadratic growth property for a weak norm.

European project(s)

SADCO - Sensitivity Analysis for Deterministic Controller Design  
— Numéro CORDIS : 264735

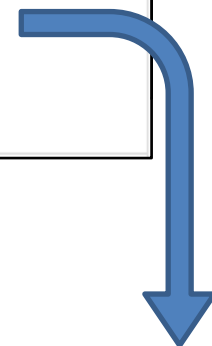
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# Optimal control of a semilinear parabolic equation with singular arcs

Article English OPEN

Bonnans, Joseph Frederic (2014)

**Publisher:** Taylor & Francis

**Related identifiers:** [doi: 10.1080/10556788.2013.830220](https://doi.org/10.1080/10556788.2013.830220)

**Subject:** singular arc | characterization of quadratic growth | [ MATH.MATH-OC ]  
Mathematics [math]/Optimization and Control [math.OC] | optimal control | second order optimality conditions | Parabolic equation

International audience; This paper develops a theory of singular arc, and the corresponding second order necessary and sufficient conditions, for the optimal control of a semilinear parabolic equation with scalar control applied on the r.h.s. We obtain in particular an extension of Kelley's condition, and the characterization of a quadratic growth property for a weak norm.; L'article développe une théorie des arcs singuliers, et les conditions d'optimalité correspondantes du premier et second ordre, pour un problème de minimisation d'un critère quadratique en l'état et linéaire en la commande, avec une équation d'état semi linéaire elliptique et une commande scalaire intervenant au second membre de l'équation. La commande est soumise à des bornes. Nous

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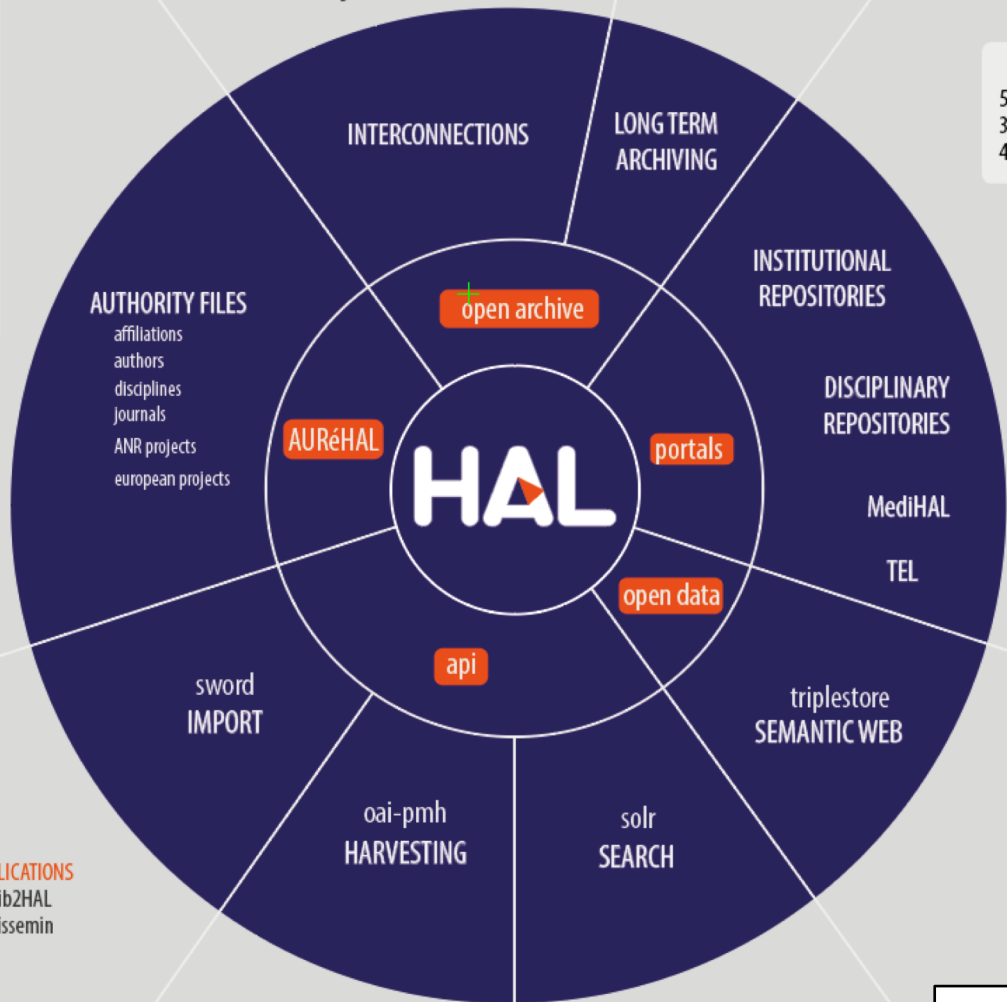
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