

2022-04492 - PhD Position F/M New observers for nonlinear dynamical systems via Lie theory, with applications to robotics

Contract type : Fixed-term contract
Level of qualifications required : Graduate degree or equivalent
Fonction : PhD Position

About the research centre or Inria department

The Inria University of Lille centre, created in 2008, employs 360 people including 305 scientists in 15 research teams. Recognised for its strong involvement in the socio-economic development of the Hauts-De-France region, the Inria University of Lille centre pursues a close relationship with large companies and SMEs. By promoting synergies between researchers and industrialists, Inria participates in the transfer of skills and expertise in digital technologies and provides access to the best European and international research for the benefit of innovation and companies, particularly in the region.

For more than 10 years, the Inria University of Lille centre has been located at the heart of Lille's university and scientific ecosystem, as well as at the heart of Frenchtech, with a technology showroom based on Avenue de Bretagne in Lille, on the EuraTechnologies site of economic excellence dedicated to information and communication technologies (ICT).

Context

The Ph.D. student will work on new methods for state estimation for some nonlinear systems based on structural properties of Lie groups and Lie algebras. He/she will design algorithms that employ the theoretical results developed during the thesis and apply them to experimental platforms.

The Ph.D. student will be part of the VALSE team in the Inria University of Lille centre.

Assignment

With the help of his supervisors (Rosane Ushirobira and Denis Efimov), the recruited person will be required to propose innovative observation methods for nonlinear systems using Lie theory. The main objectives of this project are:

1. The design of new observers using Lie theory. Thanks to the structural properties of algebras and Lie groups, the results obtained will involve closed formulas and consequently algorithms of a non-asymptotic nature, therefore simple and particularly fast.
2. Applying the theoretical results to practical problems, particularly air-land robotics. VALSE has several different platforms for experimentation.

For more details, please check VALSE's website.

Skills

Technical skills and level required: Automatic control theory, solid mathematical background, Matlab

Languages: French, English

Benefits package

- Restauration subventionnée
- Transports publics remboursés partiellement
- Congés: 7 semaines de congés annuels + 10 jours de RTT (base temps plein) + possibilité d'autorisations d'absence exceptionnelle (ex : enfants malades, déménagement)
- Possibilité de télétravail (après 6 mois d'ancienneté) et aménagement du temps de travail
- Équipements professionnels à disposition (visioconférence, prêts de matériels informatiques, etc.)
- Prestations sociales, culturelles et sportives (Association de gestion des œuvres sociales d'Inria)
- Accès à la formation professionnelle
- Sécurité sociale

Remuneration

1st and 2nd year : 1 982€ Gross monthly salary (before taxes)

3rd year : 2085€ gross monthly salary (before taxes)

General Information

- **Theme/Domain :** Optimization and control of dynamic systems
- **Town/city :** Villeneuve d'Ascq
- **Inria Center :** CRI Lille - Nord Europe
- **Starting date :** 2022-10-01
- **Duration of contract :** 3 years
- **Deadline to apply :** 2022-04-08

Contacts

- **Inria Team :** VALSE
- **PhD Supervisor :**
Ushirobira Rosane/
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About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Instruction to apply

CV + application letter + recommendation letter(s) + school transcripts

Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.