



Offre n°2024-07545

Post-Doctoral Research Visit F/M A method for approximately synchronizing heterogeneous agents

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : PhD or equivalent

Fonction : Post-Doctoral Research Visit

A propos du centre ou de la direction fonctionnelle

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).

Mission confiée

The information revolution through embedded sensors and actuators brings new possibilities but also new challenges related to the Internet of Things (IoT) and Cyber-Physical Systems (CPSs) in agriculture, robotics, health monitoring, and elderly assistance. The design of CPS involves *interdisciplinary* approaches. Notable scenarios include renewable energies in power networks and connected autonomous vehicles.

Motivated by this, our aim is to develop a practical design methodology for distributed control and estimation algorithms for interconnected CPSs. Here, by practical design, we mean crucial characteristics such as safety, rapid adaptivity, and satisfying information constraints in the distributed algorithms for CPSs. In other words, to rapidly cope with unexpected contingencies while efficiently protecting the information about the environment, people, and society, in a world where everything becomes a sensor and data.

Principales activités

There are three possible proposals, each spanned over 1.5 years.

1) Generalizing the design methodology for networked control systems by synchronization enforcement and non-identical individuals, eg, to work in the setting of discrete time.

2)

- Stage 1: Understanding how to enforce synchronization using homogeneity and sliding mode control approaches, what class of non-identicalness can be considered, and what will be the obtained emergent collective behavior.
- Stage 2: Based on this general understanding, designing synchronization enforcement based tools (using homogeneity and sliding mode control approaches) for distributed estimation of uncertain large-scale systems (taking into account possible synchronization enforcement of local estimators on global parameters and states).
- Stage 3: Developing a practical design methodology for distributed control algorithms for interconnected CPSs using synchronization enforcement (and using homogeneity and averaging methods).

3) Getting motivated by neural central pattern generators on the observed properties of robust and rapid convergence with limited resources, to develop finite-time estimation and control tools that satisfy information constraints.

Compétences

The candidate should have experience in the analysis of nonlinear dynamic systems and/or in control and estimation theory. The main mission will be the development of new theories and their practical verification.

Avantages

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Rémunération

2788€ gross per month

Informations générales

- **Thème/Domaine** : Optimization and control of dynamic systems
Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Ville** : Villeneuve d'Ascq
- **Centre Inria** : [Centre Inria de l'Université de Lille](#)
- **Date de prise de fonction souhaitée** : 2024-10-01
- **Durée de contrat** : 1 year, 6 months
- **Date limite pour postuler** : 2024-05-31

Contacts

- **Équipe Inria** : [VALSE](#)
- **Recruteur** :
Lee Jin Gyu / jin-gyu.lee@inria.fr

A propos d'Inria

Inria est l'institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l'interface d'autres disciplines. L'institut fait appel à de nombreux talents dans plus d'une quarantaine de métiers différents. 900 personnels d'appui à la recherche et à l'innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

CV + Cover Letter

Sécurité défense :

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :

Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.