2017-00159 - Post-doctoral fellow. Modeling and simulation of cable transport systems

Level of qualifications required: PhD or equivalent
Function: Post-Doctoral Research Visit

About Inria
Inria, the French National Institute for computer science and applied mathematics, promotes "scientific excellence for technology transfer and society". Graduates from the world's top universities, Inria's 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

About the research centre or Inria department
Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Context
This post-doc will be supervised by Vincent Acary (INRIA) and M. Weiss (STRMTG). Inria is the French National Institute for computer science and applied mathematics that promotes "scientific excellence for technology transfer and society". The post-doc candidate will be welcome in the Bipop project team, a research team focused on the modeling and the simulation of nonsmooth dynamical systems. STRMTG is a national technical agency that is part of the French Environment, Energy and the Sea Ministry which is in charge of ropeway and guided transport safety.

Assignment
After a careful study of the literature, the objectives of the post-doc will be:

- to develop a numerical model of the dynamics a translating cable with moving suspended pendulums over two simple supports. In this step, the dynamics of terms of waves propagation (existence and stability) will be studied in details.

- to extend the previous step towards multiple supports that takes into account unilateral contact, impact and friction. The influence of the frictional contact boundary conditions will be studied in terms of tension in the rope and amplitude of the oscillations.

- to develop a model of sheaves with fixed pulleys and a moving cable with contact and friction and to study the passage of the grip of the vehicle into the sheaves. The effect of the nonsmooth behavior generated by the contact conditions over the dynamics of the cable will be detailed. – to improve the model of sheaves by considering the rigid multi-body system that links the pulleys.

Main activities
The final goal is to develop a numerical model and software code by extending the ability of Siconos1, in order to simulate cable transport systems with various levels of accuracy in the modeling.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities
Remuneration
Gross salary / months: 2653 euros