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**ECLi_CRIStAL_Perruquetti_01**

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## PhD Proposal 2016

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<tr>
<th>School: Ecole Centrale de Lille</th>
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<tr>
<td>Laboratory: CRIStAL</td>
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**Title:** Robust control of fast dynamic system

**Scientific field:** Automatic control

**Key words:** Estimation, Control, Fast dynamics
Background, Context:

Nowadays, many systems exhibit fast dynamics or suffer from fast disturbance, ranging from typical mechanical systems to biological ones. However, for this type of fast systems, how to design the robust controller is still challenging. A simple but illustrative example could be the velocity control of motor which is quadratically influenced by the air. In this case the external air resistance substantially increases when the velocity becomes bigger. It is still a very difficult task to achieve the robust control from one set-point to another one in a prescribed time interval.

Research subject, work plan:

This proposal focuses on the robust control of fast dynamic systems. The task of the PhD student is twofold. He/she needs firstly to develop the theoretical result on the design of robust controller for fast dynamic systems, then validate them in the real platforms. The work plan are listed as follows:

1. Active disturbance rejection controller design;
2. Fixed-time controller design;
3. Formation controller design for multiple systems;
4. Validations of the proposed algorithms.

Skills and profile:

A master in control science or robotics. Knowledge of observation and control techniques is appreciated. An experience in programming (Matlab, C/C++) is valued. Knowledge of image processing and electronics is a plus.

References:


