

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...):

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Since joining Department Mechanical and Control Systems Engineering at the National Institute of Applied Sciences in 2002, Professor Vigen Arakelian has taught kinematics and dynamics of mechanisms, mechanical systems and Robotics. His research interests span mechanics of robots, robot rehabilitation devices, control of mechanical systems, synthesis of high-speed machines and parallel manipulators, numerical simulation and optimization of mechanical systems by using ADAMS software. He is author of two books devoted to the study of balancing and kinematics of robot manipulators, more than 150 scientific publications and 22 inventions.

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

The aim of the proposed research project is to develop a new design technique to reduce the power consumption of actuators of robot manipulators. To achieve the aim, the prescribed variable speed of the input links should be used. The movement of the input links by the prescribed velocity, defined from the constancy of the kinetic energy in the robot manipulator, will cancel the input torque due to the inertial effects. The originality of this approach lies in the fact that the robot manipulator is designed according to traditional methods and the cancellation of the actuating torques is only achieved by means of optimal motion control of the input links. To increase the effectiveness of the proposed solution, the control based on the prescribed variable speed of the input links can be combined with the optimal redistribution of the masses of moving links. The efficiency of the suggested solution will be illustrated via numerical simulations and experimental tests.

Keywords :

Expected collaborations :

Background required from the applicant :

- Modelling of serial robots.
- Dynamic analysis and optimization knowledge.
- Control of robots and programming in Matlab/Simulink.
- Familiarity with the softwares ADAMS and CATIA will be appreciated.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)