

Introduction to the special issue: parallel manipulators. Dr. François Pierrot (Guest Editor)

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It has been a pleasure for me to arrange this Special Issue of Robotica on Parallel Robots which provides 9 papers from authors from Asia, Oceania, North America and Europe; worldwide research on this topic is proof of the growing interest of both the scientific and the industrial areas of parallel mechanisms. I truly believe that the main reason for this enthusiasm is that parallel mechanisms research extends from theoretical mathematics and kinematics to applied robotics, and even beyond, creating new technological challenges.

I tried to organize the issue in this fashion by providing papers which deal with kinematics or design, present calibration techniques or dynamics problems, proposed new structures and even advanced application fields.

Thus this Special Issue is arranged as follows:

(1) Zsombor-Murray and Gervasi present their thoughts regarding the congruence of circular cylinders; this paper could seem to be not parallel-robot-oriented but, in fact, it presents one of the tools one would need in the design process of general parallel mechanisms.

(2) Murray *et al* face up to the problem of designing a parallel manipulator capable of reaching a prescribed workspace. To do so, they use the mathematical tool known as *Dual Quaternions* to represent in a consistent way both orientations and translations.

(3) Merlet proposes a complete design methodology for parallel robots. This DEMOCRAT methodology presents great versatility, since both the description language and the computation algorithms can be freely extended.

(4) Nenchev *et al* consider the difficult problem of parallel robot singularities and show that motion through certain types of these singularities is possible!

(5) Zanganeh *et al* study in details the kinematics and dynamics of 6-dof parallel manipulators with “revolute legs.” Such manipulators provide bigger workspace than those with telescopic legs, but lead to more complex problems that the authors solve in a very elegant way.

(6) Lintott and Dunlop detail interesting work regarding parallel robot calibration, an indispensable step towards building industrial machines (robots or machine tools).

(7) Leguay-Durand and Reboulet present an original design for a spherical redundant robot; with an elegant mechanical arrangement and a redundant actuation, their manipulator provides a workspace large enough for the machine be used as a robot wrist or a master device in a tele-operated set-up.

(8) Lallemand *et al* present a very interesting extension of the DELTA robot. The original DELTA provided only 3 (or 4) degrees of freedom, but their 2-DELTA robot has the full 6 degrees of freedom, with the orientation and translation uncoupled.

(9) Pernette *et al* show in their paper one of the most promising field of application for parallel robots, viz. microrobotics. In this domain, the accuracy of such mechanisms could be a good answer to future challenges.

I hope that you will enjoy this Special Issue as much as I enjoyed preparing it, and I am anticipating an early appearance of many parallel structures in laboratories and industry.