

Scientific Report

During the last years a great deal of progress has been made in the field of walking machines as far as control, leg coordination, rough terrain mobility and so on are concerned. An increasing number of groups of scientists in different European countries have been engaged in basic research in legged locomotion and in designing and building walking machines for various kinds of applications.

Nevertheless, all technical realizations of walking machines still perform very poorly as compared with biological examples. If one looks at legged locomotion of animals, of insects, horses or antelopes, the immense superiority of biological systems becomes obvious. During a long period of evolutionary processes, biological systems have reached a very high degree of perfection in mobility and adaptability. They have optimized their masses, geometry, mechanisms, sensors, actuators and control systems.

Therefore, one of the main objectives of this colloquium was, to bring together leading European scientists, who are interested in legged locomotion, but who are specialists in quite different fields, such as kinematics and dynamics of multibody systems, robotics, control engineering, mathematics, information sciences, sensors and actuators, biomechanics, neurobiology, etc.

We were very lucky, that the great majority of invited scientists participated in the colloquium and presented their current work. Almost all European groups working in the field of walking machines were represented at the colloquium.

In total there were 24 presentations from 11 different countries. Each presentation was followed by a very intensive and inspiring discussion. The colloquium confirmed the high scientific level of European groups, which could catch up with groups in USA and Japan during the last years.

In the future, major progress in the development of walking machines may be expected from the intensive cooperation of engineers and biologists, as far as mechanical design, leg movement coordination and behaviour-based control concepts are concerned. This cooperation promises to be advantageous to both sides: Modelling of animals as multibody systems gives the possibility for computer simulations and to gain in this way a better understanding of animal and human locomotion and the underlying principles of optimization during evolution. Understanding more about mechanisms, control strategies, reactivity, and adaptability of animals may contribute to transfer some of the potential of legged locomotion to walking machines.

Having quite different scientific backgrounds, many of the participants had not met before, and therefore, the colloquium was very successful in establishing new contacts and interdisciplinary cooperations.

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