

Briefing of AMAM2003

It is our dream to understand principles of animals' remarkable ability in adaptive motion and to transfer such abilities to a robot. Up to now, mechanisms for generation and control of stereotyped motions and adaptive motions in well-known simple environments were formulated to some extent and successfully applied to robots. However, principles of adaptation to various environments have not yet been clarified, and autonomous adaptation is left unsolved as seriously difficult problem in robotics.

Apparently, the ability of animals and robots to adapt in a real world cannot be explained or realized by one single function in a control system and mechanism. That is, adaptation in motion is induced at every level from central neural system to musculoskeletal system. Thus, we organized this symposium for scientists and engineers concerned with adaptation on various levels to be brought together, to discuss principles at each level and to investigate principles governing total systems. We believe that this symposium will stimulate the interest of both scientists and engineers.

In this symposium, several functions of skeletal systems (mechanisms), muscles (actuators) and nervous systems (control) in adaptive motion will be discussed. In addition, relations and coupling between them should become important issues for discussion. The background of papers in the technical sessions ranges across biology, physiology, biomechanics, non-linear system dynamics and robotics. It is usually difficult for people from different disciplines to discuss particular issues. In order to ease this problem, we invited nine keynote speakers well accomplished in each field. We expect from each keynote speaker to present a comprehensive knowledge found in his field to the audience before the start of the more specialized technical sessions.

No matter what we discuss, "Science vs. Engineering" or "Biology vs. Robotics" is not one of the key issues in AMAM. When we solve complicated problems, it is desirable to proceed with analysis and synthesis concurrently. It is well-known that analysis by synthesis is worthwhile and important methodology to understand principles. We hope AMAM marks the beginning of a new interdisciplinary research field where science and engineering are merged.

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