

# The 12th Symposium on Theory of Machines and Mechanisms

Date: June 30, 2006

Place: Conference Room 304, 3rd Floor, Ishikawadai 3 Bldg. ,  
Tokyo Tech (Ohokayama Campus)  
2-12-1 Ohokayama, Meguro-ku, Tokyo 152-8552  
(8 min. walk from Ohokayama Station, Tokyu Meguro-line and Ohimachi-line)

Program:

8:55 Opening Address by Yoshihiko NAKAMURA  
President, Jc-IFTtoMM (The University of Tokyo)

Session 1 : Analyses of Mechanisms (9:00-10:20)  
Chair: Haruo HOUJOH (Tokyo Tech)

9:00 Linear Motion Mechanism with Grasp Force Magnification  
\*Takeshi TAKAKI(Graduate Student, Tokyo Tech), Toru OMATA(Tokyo Tech.)

9:20 Three Dimensional Shape Analysis for Face-Hob Cutting Hypoid Gears  
\*Masaki KANO(Fuji Heavy Industries Ltd.), Keiichiro TOBISAWA, Kohei SAIKI,  
Takeshi YOKOYAMA and Akira ONO

9:40 Mechanism of the Man-Nen Dokei : A Historic Perpetual Chronometer  
\*Yasuhiro YOKOTA(Toshiba Corp.), Mitsunobu YOSHIDA, Takahiro HATO,  
Yuji KUBOTA and Kazuyoshi SUZUKI(National Science Museum)

10:00 Proposing Manipulation Using Hyper-flexible Elements  
\*Takahiro SUZUKI(Univ. of Tokyo), Yuji EBIHARA(Toyota Motor Corp.) and  
Takahiro SUZUKI(Mitsubishi Electric)

Session 2 : Trajectory Generation for Robots (10:30-11:50)  
Chair: Norio INOU(Tokyo Tech)

10:30 Robot Motion Emergence by Orbit Attractor Design for Tapping Dance Robot Control  
- Application for Robot Motion with Drastic Change of Dynamic Property -  
\*Kenji MURAKAMI(Tokyo Tech), Masafumi OKADA and Nobuyuki IWATSUKI

10:50 Legged Motion Planning of Humanoid Robots That Change Contact States Variedly under  
Severe Time Constraints  
\*Kou YAMAMOTO(Univ. of Tokyo), Tomomichi SUGIHARA and Yoshihiko NAKAMURA

11:10 Resolved Motion Space Control for a Redundant Serial Manipulator  
\*Yasuyoshi TAKI (Tokyo Tech), and Koichi SUGIMOTO

11:30 Communication Acquisition of Humanoid Robot through Interaction with Its Partner  
\*Wataru TAKANO (Univ. of Tokyo), Katsu YAMANE and Yoshihiko NAKAMURA

Session 3 : Dynamics (12:00-1300)  
Chair: Masahito YASHIMA (National Defense Academy)

12:00 Analyses of Nonlinear Vibration System by Higher Order Spectra  
\*Hiroyuki MATSUMOTO(Institute of Technologists), Tomoyoshi OYAMA (Kehin),  
Hisami OHISHI(Kogakuin Univ.) and Shinji YAMAKAWA

12:20 Design of Dynamic Damper to Support Chatter in Long, Slim Cutting Tools  
\*Hiroyuki FUJIWARA (National Defense Academy), Osami MATSUSHITA and  
Takahiro TAMURA

12:40 Linear Rectangular Air Bearing Based on Squeeze Film Generated by Ultrasonic Oscillation  
\*Takaaki OIWA (Shizuoka Univ.) and Ryosuke SUZUKI

13:00 ~ 14 : 20 Luncheon

- Special Lecture : (14:20-15:00)  
 Lecturer : Prof. Katsuo KURABAYASHI(University of Michigan)  
 Lecture Title:  
 Biomolecular Motor Nano/Micro Hybrid Devices for Power Extraction and Biosensing
- Abstract:  
 Biomolecular motors are nanometer-scale molecular machines that convert chemical energy into mechanical work. They are responsible for mass transport and cell movement in biological systems. The nanotechnology research community has recently been exploring the development of new hybrid devices that incorporate biomolecular motors in a non-biological engineered structure. Manipulation of nanomechanical structures using these motors is an excellent example of utilizing life's natural resources to power man-made systems at high fuel-to-power conversion efficiency. This talk discusses our recent research on nano/micrometer-scale force production and molecular sensing with biomolecular motors. Expected advantages and technological challenges accompanying the development of the hybrid devices are also discussed.  
 Chair : Nobuyuki IWATSUKI (Tokyo Tech)
- Session 4 : Micromechanism and Actuators (15:10-16:10)  
 Chair: Yukio SAITO (Tokyo Denki Univ.)
- 15:10 Fabrication of Piezoelectric Thin Film on a Micro Cilium Actuator by Hydrothermal Method  
 \*Kenjiro MORITA(Graduate Student, Tokyo Tech), Nobuyuki IWATSUKI(Tokyo Tech) and Koichi MORITA
- 15:30 Making to Long Life of Large-Deflective Hinges of Molding Pantograph Mechanisms  
 \*Yasuyuki SAITO(Graduate Student, Tokyo Tech), Daiki KAMIYA(P & I Lab.,Tokyo Tech) and Mikio HORIE
- 15:50 The Development of the Electrostatic Actuator for a Micro Camera Module  
 \*Toshikatsu AKIBA(TOSHIBA), Akihiro KOGA, Mitsunobu YOSHIDA and Sunsuke HATTORI
- Session 5 : Biomechanics and Development of Welfare Devices (16:20-18:00)  
 Chair: Koichi SUGIMOTO (Tokyo Tech)
- 16:20 Biomechanics of Free Climbing - Mathematical Modeling of Climbing Posture -  
 \*Yoshihiko OTAKI(Tokyo Tech), Michihiko KOSEKI, Hitoshi KIMURA and Norio INOU
- 16:40 Passive Stiffness Estimation of Human Joints and its Medical Applications Based on Musculoskeletal Dynamics Model and Motion-Capturing  
 \*Gentiane VENTURE(Univ. of Tokyo), Yoshihiko NAKAMURA and Katsu YAMANE
- 17:00 Study of Rehabilitation Arm and Lower Limbs Powered Orthosis  
 \*Shunn HACHIMURA(Tokyo Denki Univ.), Thomas MAIRE(ENSM), Yukio SAITO (Tokyo Denki Univ.), Kisumasa HANE and Hiroshi NEGOTO
- 17:20 Development of Tactile GUI Device for Blind Computer User  
 - Development of the Third Trial Device -  
 \*Shigenobu SHIMADA(TIRI), Shun NAGASAWA(UEC), Masami SHINOHARA(AIST), Yutaka SHIMIZU(UEC), Makoto SHIMOJO
- 17:40 Study on the Basic Experiment of Bilateral Servo and the Application to a Power Window  
 \*Shingo KOIZUMI(Tokyo Denki Univ.), Yukio SAITO, Takamitsu TAJIMA(Honda R&R) and Tsukasa OKAWA
- 18:00 Closing Address by Haruo HOUJOH  
 Vice President, Jc-IFTtoMM(Tokyo Tech)
- 18:05 Annual Meeting 2005 (18:05-18:40)  
 Address from president:  
 Yoshihiko NAKAMURA(Univ. of Tokyo)  
 Chair : Nobuyuki IWATSUKI (Tokyo Tech)
- 19:00 Wine party (19:00-20:30)  
 at Seminar Room 655, 6th Floor, Ishikawadai 1 Bldg.  
 The fee is 5,000 Jpn yen and free for students.