Makoto YOKOYAMA, Dr. Eng.

Associate Professor
Program: Advanced Materials Science and Technology
Area: Advanced Mechanical Science and Technology
Undergraduate: Dept. of Mechanical & Production Eng.

Professional Expertise

His area of research and education involves control system design for automotive systems and robots, to which several kinds of nonlinear control theories such as sliding mode control have been applied. He and his group developed ABS, electronic throttle control systems and semi-active suspension systems. Recently, he has been very interested in Immersion & Invariance adaptive control, and applied it to a semi-autonomous helicopter. Furthermore, reinforcement learning has attracted him and been applied to traction control for vehicle robots.

Research Fields of Interest

Automotive systems: ABS, electronic throttle control, Automatic Transmission, Suspension.
Vehicle Robots etc.: four-rotor mini helicopter, all-terrain vehicle for rescue, skid steer vehicle, power-assist system.
Nonlinear control theories: sliding mode, back-stepping, reinforcement learning, I&I adaptive control.

Education

1990: Doctoral Eng. degree, Graduate School, Tokyo Metropolitan Univ. Japan
1986: Master Eng. degree, Graduate School, Tokyo Metropolitan Univ. Japan
1984: Bachelor Eng. degree, Graduated from Dept. of Mechanical Engineering, Tokyo Metropolitan Univ. Japan

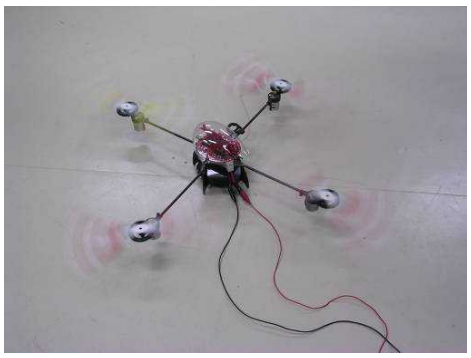
Professional Societies and Activities

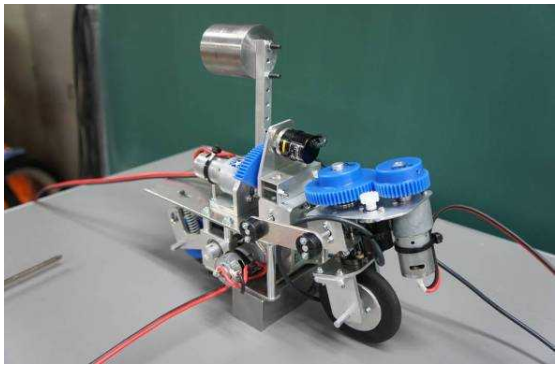
1. Associate editor of JSDD (JSME English Journal)
2. Member of accident fact-finding committee in cable way, The Ministry of Land, Infrastructure
3. General Chair of Joint Conference of Automatic Control 2013 in Japan
4. Visiting scholar of UC Berkeley (1998-1999)

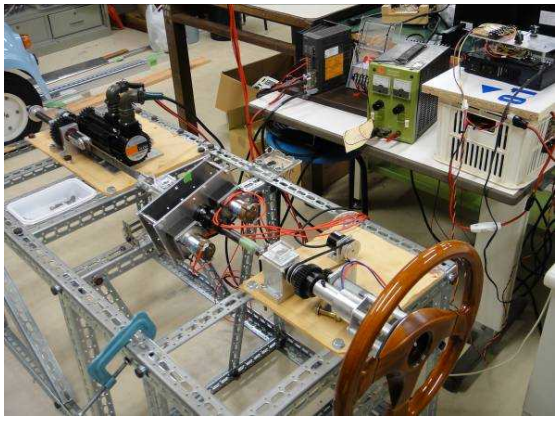
Major Publications

Books

[1] Autonomous Control Systems and Vehicles, Springer, Modeling and Control of Wheeled Mobile Robots: From Kinematics to Dynamics with Slipping and Skidding, pp195-209, 2013
[2] Advanced Motion & Vibration Control (in Japanese), Kyoritu (JSME ed.) 2007
[3] Control Engineering (in Japanese), Asakura-shoten, 2003
[4] Vibration Engineering-Examples and Exercises-(in Japanese), Maruzen, 1994
[5] Vibration Engineering (in Japanese), Maruzen, 1993







Papers

[1] I&I adaptive control by DSC approach for parameter strict-feedback systems, ASME DSCC/MOVIC, 2012

[2] Control via back-stepping and DSC approach for a two-wheeled robot with slipping and skidding, ASME DSCC/MOVIC2, 2012

[3] Position tracking control of a skid-steering vehicle robot, The International Conference on Intelligent Unmanned Systems, 2012

[4] I&I Adaptive Control via Dynamic Surface Control Approach for A Four-rotor Mini Helicopter, The International Conference on Intelligent Unmanned Systems, 2011

[5] Intelligent all-terrain vehicle robot with movable auxiliary mass, The International Conference on Intelligent Unmanned Systems, 2011

[6] Position tracking control via DSC approach for a two-wheeled robot with slipping and skidding, The International Conference on Intelligent Unmanned Systems, 2011

[7] I&I-based Adaptive Control of A Four-Rotor Mini Helicopter, Annual Conference of The IEEE Industrial Electronics Society, 2010

[8] Adaptive Control of A Four-Rotor Mini Helicopter, The 10th International Conference of Motion and Vibration Control, 2010

[9] Integral Sliding Mode Control with Anti-windup Compensation and Its Application to a Power Assist System, Journal of Vibration and Control (E-Journal), 2009

[10] Velocity Tracking Control of a Four-Rotor Mini Helicopter, pp.335-344, Springer, 2009

[11] Robust Velocity Tracking Control with an Observer for Four-rotor Mini Helicopter, IFAC SYROCO09, 2009

[12] Sliding Mode Control for Electric Power Assist Systems, JSDD, Vol.1, No.2, 2007

[13] Sliding Mode Control of Skid Steer Vehicle, The 20th International Symposium Dynamics of Vehicles on Roads and Tracks, pp187-189, 2007

[14] All-Terrain Vehicle Robot with Controllable Auxiliary Mass, The World Forum on Smart Materials and Smart Structures Technology, 2007

[15] Integral Sliding Mode Control with Anti-windup Compensation and Its Application to a Power Assist System, The 8th International Conference on Motion and Vibration Control, 2006

[16] Practical Model Following Sliding Mode Control of Semi-Active Suspensions, The 7th International Conference on Motion and Vibration Control, 2004

[17] A design method of sliding mode controller for servo-systems subject to actuator saturation, JSME International Journal, Vol. C-46, No. 3, pp. 960-966, 2003