Division of Electrical Engineering and Computer Science	Research field	Systems and Control	Lab. ID EC01
Laboratory web site	http://moccos.w3.kanazawa-u.ac.jp/		

Research subjects

Our research field is on systems and control from both of the theoretical and the practical points of view. Cotnrol is a key science and technology which mathematically consider universal principle by which we can achieve the purpose. The areas applied by the universal prinbciple are on all issues related to ``dynamics'' which appear in various firelds like electronics, mechanics, chemical, informatics, biology and so on. Particularly, control technology is utilized for industirl process, viehcles, planes, power plants, and on. Our research group focuses on modeling and control of complex dynamical systems. Main topics are the following:, utilization of the data for the design of effective control systems and the realtime optimization, multi-agent systems, control of power generation, and so on. We try the establishment of control theory and techonology for the establishment of comfortable and safe society.

Master/Doctor course: Education policy, curriculum, typical activity in the laboratory

Every student addresses indenepedent research theme basically. At a laboratory seminar, each student has a talk on research topics for all members so as to make them to understand main features of her or his research and the reserach members have a fruitful discussison on the topic. In addition to such a regular seminar, some of the members often have a subject-specific seminar, a journal club (lecturing in turn the speicific theme which they are intersted in). Students are recommended to present a result of the research in academic conferences or symposiums to enhance the skill of the presentation. Moreover, the master course students are also recommended to write a paper for the submission to a scientific journal. The doctor course students have to write a paper to be accepted by a journal for her or his doctoral degree. In the case where the research topic is close to that of the other student, they often collaborate the research. In such a case, an elder student guides a younger student. Though the time in which the students should be in the laboratory is not fixed, the students are recommended to be in the laboratory in the day-time, for example, 10-17 o'clock. In the laboratpry, the students get concentrated on the study and the research in that time. We do not have any experiment which takes a long time until midnight. Since we accept students from foreign cuontry, Japanese students can polish their English skills.

Daily life in the laboratory, etc.

Basic enviroment for research is well arranged. For exmaple, every students is allotted one personal computor so as to do research without any incovenience (teacher). We can concentrate on our research on weekdays and I freely enjoy singing in my chorus club on a holiday (M1). Since there are many students in our research gourp, we can always have discussion with another students and ask any question to elder students (M1). The teacher accept questions on not only the resarch but also any other topic like a daily life. The envioonment for the research is well organized and arranged because every student can always use the alloted computor (M2). We can spend funny study life irrespective of age and nationality. Not only research but also we participate in campus events actively, such as a relay road race and softball tournament (M1).

Message or comments by the laboratory faculty staffs

We hope that the students are with communication skills, ogical thinking and so on until their graduation. Control is, what is called, ``cross-disciplinary science'', which implies that control is available, useful, and required in the every engineering and science. The objective is firstly regarded as a system, then the substantial part in the problem is figured out, and the ideal controller is designed to acehive the purpose. Throughout such a process in the design of the controller, the students are expected to be with system aided thinking which is absolutely effective in the society. In addition, not only engineering but also biology and social science requires modeling and control. If you are intersted in control, let us study it together. In addition, the emplyment of the almuni of our research group are the area of car, heavy industries, electonical systems, and so on, whose common feature is that they address the objective on the dynamics. If you are interested in such an emplyment, control would be appropriate choise as the research theme in the master or doctor course students.

Recent Master theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)
2017.3	Experimental Verification of Data-Driven Pole Placement Method by Using a Ball & Beam System
2017.3	Performance Analysis of the Data-Driven Pole Placement Method
2017.3	A study on ultradiscretization for partial differential equation
2017.3	Data-driven predictive control for autonomous vehicle lane keeping
2017.3	Decentralized model predictive control for traffic signal
2016.3	Extremum Seeking Control for Power Maximization of Wind Energy Systems

2016.3	Study on the Control and Estimation in Hot Rolling Process
2016.3	Extremum Seeking and I-V Scan Method for Maximum Power Point Tracking of Photovoltaic Systems under Partial Shaded Conditions
2016.3	A Study on Collective Motion by Self-Driving Robots and Its Control
2016.3	A Study on a System Identification Method by Using Back-Ultra Discretization
2015.3	Studies on Data-Driven Update of Controller Consisting of State Feedback and Observers
2015.3	Studies on the Attenuation and Identi cation of Periodic Disturbance in Strip Process
2015.3	Simultaneous Attainment of the Compensation and Estimation of Hysteresis Chacteristics for the Pneumatic Artificial Based on Data-Driven Internal Model Controller
2015.3	The Global Modeling and the Internal Model Control for the Nonlinear System based on Laguerre Network
2015.3	Model Predictic Control Based on a Nonlinear ARX Model and l1 Norm Minimization
2015.3	A Remark on Synthesis of Adaptive Model Predictive Control
2015.3	A study on a Cellular Automaton Model Identification Method Based on l1 Norm Minimization
2014.3	Studies onData-Driven Controller Tuningfor Attenuation of Periodic Disturbances in the Steel Rolling Process
2014.3	Data-Driven Tuning in Servo Systems of a State Feedback
2014.3	Power Maximization of Photovoltaic Systems and Wind Energy Systems based on Extremum Seeking Control
2014.3	Analysis of 4-Channel Bilateral Cotnrol Based on the Second Order Differential Equation and Controller Tuning
2014.3	Charge-Discharge Optimal Control of the Capacitor Power Storage Systems
2013.3	Structural Analysis of Control Systems with Internal Model
2013.3	A Method of applying Iterative Learning Control for a Plant with Time Delay
2013.3	A Method for Identification of a Linear System under Periodic Disturbance
2013.3	Studies on Data-Driven Control for Non-Minimum Phase Syetsm
2013.3	Design of a Controller Considering Operability of Master-Slave Systems
2013.3	Trafic Flow Control Preserving a Driver's Characterstics and Its Effect on Reducing Trafic Jam Phenomena
2013.3	Performance Analysis of Output Random Dither Binary Quantization for Feedback Control Systems
2012.9	A Study on Just-In-Time Predictive Control for a Robot
Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2017.3	Maximum Power Point Tracking of a DFIG Wind Turbine System
2017.3	Model-Free Predictive Control for Nonlinear Systems
2015.9	A Study on Multi-Agent Systems for Stable Matching
2015.9	A Study on Data-Driven Predictive Control
2014.9	Extremum Seeking for Dead-Zone Compensation
2013.3	Studies on Data-Driven Approach to Internal Model Control
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