Division of Electrical Engineering and Computer Science	Research field	Systems and Control	Lab. ID EC01	
Laboratory web site	http://mocc	<u>os.w3.kanazawa-u.ac.jp/</u>		
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 principle 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 technology 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 laboratory, 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)			
2021.3	A study on cooperative localization of multi-robots by using only relative distance information			
2021.3	State estimation and model predictive control for strip steering control in hot strip finishing mills			
2021.3	The Design Method of NC Circuit for Maltimodal NC-Piezoelectric Shunt -Damping			
2021.3	Clustering and local regression for improvement of a setup model for hot strip finishing mills			
2021.3	Improvement of environmental adaptability of vibration power generation systems by real-time parameter adjustment using extremum seeking control			

2020.3	A Study on the Application of the Linear Periodic Control Law to Floating Offshore Wind Turbines
2020.3	Prefilter design in a data-driven tuning method for a model error compensator
2020.3	Output maximization of a vibration power generation system by real-time parameter tuning using
2020.3	extremum seeking control
2020.3	A study on the Singular Structure inside the Orthogonal Roof-type 4CMG system
2020 3	Efficiency Optimization for Permanent-Magnet Synchronous Machines by Model-Referenced
2020.0	Square-wave Extremum Seeking Control
2019.9	Study on analysis of rank conditions in data-driven predictive control
2019.3	Control of chaos via data-driven recursive delayed feedback
2019.3	A Study on the Computation of Inverse Kinematics for the Orthogonal Roof-type 4CMG system
2019.3	Position Control by Sensor Data for Segmented Mirrors of SEIMEL Telescope
2019.3	Improvement of prediction models in a steel rolling process
2019.3	Walking control in hot strip rolling
2018.3	Extremum seeking control for output power maximization of wind turbine power generation systems
	Ontimum operating point tracking control in a coupled system of solar papel and water electrolysis
2018.3	
2018.3	A study on cellular automaton models representing traffic flow and traffic congestion control
2018.3	Visualizing Method of Solutions to Inverse Kinematics for CMGs system
2018.3	A design method of negative capacitor circuit for piezoelectric shunt damping
2018.3	Just-In-Time tuning for lane keeping control using image data
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
00100	Extremum Seeking and I–V Scan Method for Maximum Power Point Tracking of Photovoltaic
2016.3	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
2010.0	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
2015.2	Nelwork Medel Prodictic Central Record on a Nanlinger ARY Medel and 11 Norm Minimization
2015.3	A Remark on Sunthasis of Adaptive Medel Predictive Control
2015.3	A Remark on Synthesis of Adaptive Model Identification Method Based on 11 Norm Minimization
2015.3	Studies onData-Driven Controller Tuningfor Attenuation of Periodic Disturbances in the Steel Rolling
2014.3	Process
2014.3	Data-Driven Tuning in Servo Systems of a State Feedback
0014.0	Power Maximization of Photovoltaic Systems and Wind Energy Systems based on Extremum Seeking
2014.3	Control
2014.3	Analysis of 4-Channel Bilateral Cotnrol Based on the Second Order Differential Equation and
2014.3	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	I ratic Flow Control Preserving a Driver's Characterstics and Its Effect on Reducing Trafic Jam
0010.0	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 Doct	Toral theses in these 3 years (+ more it appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)			
2018.3	A Study on Identification Methods for a Cellular Automaton Models Based on L1-Norm Optimization			
2018.3	Parametrization of data-driven controller with Kautz expansions			
2017.9	Studies on Data-Driven Controller Tuning for Cascade Control Systems			
2017.9	A Numerical Simulation Study of Data-driven Pole Placement			
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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