

Division of Mechanical Science and Engineering	Research field	Advanced Design	Lab. ID
			MS12
Laboratory web site	http://ads.w3.kanazawa-u.ac.jp/index.html		
Research subjects			
<p>Based on basic mechanical engineering of mechanics, material mechanics and mechanical design theory, we have developed advanced study fields of "robotics" and "medical or rehabilitation robotics".</p> <p>Robotics: we study an optimized program for trajectory of robotic manipulator using SHA(heuristic algorism).</p> <p>Rehabilitation robotics: we study a wrist rehabilitation device for broken wrist, an evaluation of human balances using a parallel wire driven mechanism, skill assist arm, and so on.</p> <p>Note that we have collaborated with Strength Design filed (Higuchi associate professor).</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>All master course students belong each study group. For cooperating with staff, the students are required that they take it upon themselves to resolve each task. To conduct studies, the students learn kinematics and dynamics, design with 3D CAD, design sensor system, construct controlling programs, and product mechanical parts.</p> <p>For improvement of logical thinking and engineered writing skills, the students write debrief reports of study and debrief every week. In addition, to improve presentation and communication skills, a seminar presented own study is conducted biannually.</p>			
Daily life in the laboratory, etc.			
<p>We operate "Advanced Design Laboratory" with Strength Design filed (Higuchi associate professor). The laboratory aim for an environment of living a regular life and conducting study in a systematic manner without putting up at the laboratory. On the other hand, to deepen exchanges, the laboratory hold welcome party, camp, year-end party, and so on. In the laboratory the students can use developed device, large-scale testing device such as a tensile tester and machine tools such as drilling machines at three experimental laboratory.</p>			
Message or comments by the laboratory faculty staffs			
<p>Please work aggressively to conduct cutting edge robotic studies. Through the studies, we aim for developing your own self and establishing a basement as engineer and a member of society. Because the students learn basic mechanical engineering of mechanics, material mechanics and mechanical design theory, these knowledge and skills help them in future. Because almost students work at company after graduating master course, the students judge own adequacy through studies and exchanges.</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Design of a Lightweight Parallel Mechanism with Springs and Wires for Human Body Motion		
2017.3	Development and evaluation of a 3-axis small machine tool with high accuracy and cutting capability		
2017.3	High-precision processing by multi-degree of freedom machine tools with measurement/control of force and position		
2017.3	Development of a 5-DOF robot arm to assist human skill in space		
2016.3	Simple method for vibration damping by ultrasonic linear motor		
2016.3	Development of a 3-DOF Underactuated Robot Arm for Skill Assist		
2016.3	Clarification of the recovery mechanism of wrist contracture by proposed therapy and development of the rehabilitation equipment		
2016.3	Study of an intelligent tire to detect road conditions		
2016.3	Design of a high-precise small size machine tool for realization of compact production lines		
2016.3	Method for constructing the compensation of thermal deformation of machine tools by quality engineering		
2015.3	Trajectory heuristic optimization of manipulator without dynamics		
2015.3	Validation of medical effect by development of a wrist contracture rehabilitation device		
2015.3	Evaluation by a measurement device of human standing balance and application for falling prevention		
2015.3	Processing accuracy improving method for machine tool inhibiting thermal and dynamic deformation effect		
2014.3	Burnishing process using hybrid-type parallel mechanism with force control		
2014.3	Development of an intelligent tactile tire sensor measuring friction coefficient on road surface		
2014.3	Development of a skill assist arm using a passive joint		
2014.3	Evaluation of wrist contracture improving rehabilitation effect for carpal dynamic analysis		
2014.3	Study of improving accuracy of minimum NC machine tool for DTF		
2014.3	Study of human standing balance evaluation using a parallel wire driven mechanism and falling prevention device		
2013.3	Optimized trajectory genesis method for manipulator without dynamics analysis		
2013.3	Burnishing process using spherical 5-DOF hybrid-type parallel mechanism with force control		
2013.3	Improvement accuracy of small CNC lathe by thermal deformation prediction		
2013.3	Measurement of human standing balance using a parallel wire driven mechanism		
2013.3	Realization of skill assist by an underactuated robotic arm		
2012.9	Development of a tactile sensor for an intelligent tire measuring friction coefficient on road surface		

Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2015.9	Study of a tactile sensor for a tire to measure friction condition of a traveling road surface
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