

Research topics for graduate students for 2023

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Acceptable course(s)

- Master's Degree
- Doctoral Degree



Research Topics

The main research topic is robotics and robot system integration including mechanical design, bio-inspired robotics, mechatronics, and laboratory automation using robotics. Following are a few research topics.

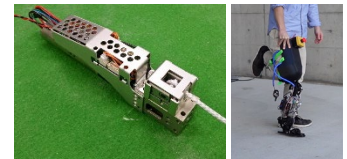
1. Bio-inspired robot design and system

We have developed several bio-inspired humanoids [1]. Those were designed to have high bio-fidelity to human musculoskeletal system. Development of human mimetic body structures and control system for such body are interesting topics.



2. Robot module and application

Robot module is basic and integrated component of robots. It includes assembly design of actuator module [2], joint module and so on. Since it is essential element of robots, wide range of application from humanoid to prosthesis [3] can be considered.



3. Laboratory automation using robotics and machine learning

Laboratory automation system is being developed toward autonomous materials development. Robot manipulation, environment/tool design for robot and machine learning for experiment design are important in this research field.



Articles Related to Research Topics

- [1] Yuki Asano et al., "Design principles of a human mimetic humanoid: Humanoid platform to study human intelligence and internal body system", *Science Robotics*, **2**, 13, eaaq0899, 2017. [DOI: 10.1126/scirobotics.aaq0899]
- [2] Yuki Asano et al., "A Sensor-driver Integrated Muscle Module with High-tension Measurability and Flexibility for Tendon-driven Robots", in *Proc. of the 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 5960–5965, 2015. [DOI: 10.1109/IROS.2015.7354225]
- [3] Yuki Asano et al., "Development of prosthesis prototype through industry-government-academia collaboration of automobile driving by tendon-driven humanoids", *2022 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO)*, pp. 1-7, 2022. [DOI: 10.1109/ARSO54254.2022.9802967]

Lab. Web page: <http://www.phonon.t.u-tokyo.ac.jp/?lang=en>