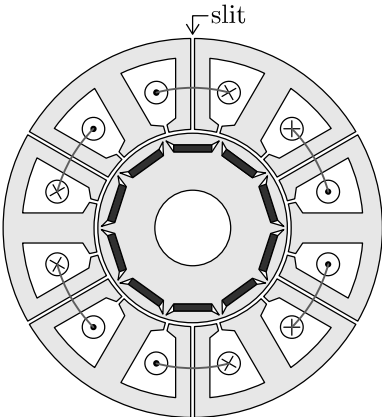
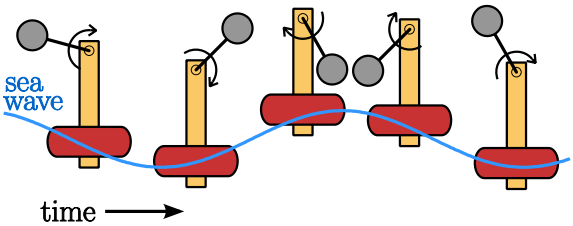


Name YOKOI Yuichi	Job Title Associate Professor	Area of Expertise Electrical Machinery, Nonlinear Dynamics
1. Main Research Topics ① Development of high-performance motors and generators More than half of the total electricity consumed in Japan is used by motors. Additionally, under government policy, the adoption of electric vehicles powered by motors and wind power—one of the most promising renewable energy sources—is being accelerated. Against this backdrop, improving motor and generator performance, including efficiency, torque quality, and torque/power density, is becoming increasingly important. This research aims to enhance the performance of motors and generators by adopting concentrated winding, a winding method for the coils that has not been widely used until now. Concentrated winding shortens the length of the wire, which can reduce losses and improve efficiency, as well as enhance torque and power density by reducing the overall size. However, conventional motor design methods are not directly applicable to this type of winding. Therefore, we are developing and proposing various new design techniques specifically for motors and generators using concentrated winding, with the goal of improving their performance. The right-hand figure shows a slit stator motor that we have developed to improve both efficiency and torque.  ② Development of rotating-pendulum wave-energy converters Nagasaki University is actively engaged in the development of ocean energy. This research aims to commercialize a wave power generation system that harnesses wave energy—a form of ocean energy abundantly available anywhere on the sea surface. Once realized, this system will enable the use of electrical energy in any marine area. The wave power generation mechanism under investigation utilizes the nonlinear characteristics of a nonlinear dynamical system known as a parametric pendulum, which converts one-dimensional vibrations into rotational motion. In the proposed rotating-pendulum wave energy converter, the vertical motion of ocean waves is treated as one-dimensional vibration, which causes the pendulum to rotate. Electricity is then generated by a rotary generator attached to the pendulum. This generation mechanism allows the mechanical pendulum and generator to be enclosed and isolated from seawater, significantly reducing the risk of failure due to salt damage. Furthermore, since the system only requires mooring for installation, it offers the advantages of lower installation costs and expanded applicability across various sea areas. 		
2. Keywords Motor, Generator, Concentrated Windings, Wave power generation, Parametric pendulum		
3. Remarks and Websites In the development of motors and generators, we first understand the fundamental principles, and then validate them through simulations and experiments. To date, we have conducted joint research with industry on motors for electric vehicles and generators for wind power systems. The rotating pendulum-type wave energy conversion system is also being advanced as part of my role as a concurrent faculty member at the Nagasaki University Institute for Marine Industry. researchmap: https://researchmap.jp/u1.yokoi Laboratory: https://motor.eee.nagasaki-u.ac.jp		