**Development of Universal Parallel Gripper**

**Background**

Generally, industrial robots have to exchange grippers in accordance with the shape and posture of the objects.

- **Selection of the appropriate gripper.**
- **Change of grip planning by the selection.**

![Fig. 1 Industrial robots’ automatic exchanger.](image1)

**Related work**

Recently, several universal grippers that can handle more shapes than normal gripper have been developed.

![Fig. 2 Structure and overview of MRα-fluid gripper.](image2)

**Parallel gripper**

This gripper has two fingertips constructed with flexible membrane enclosing MRα-fluid. We developed a mechanism which move a permanent magnet in order to control viscosity of MRα-fluid, and a novel flexible membrane.

![Fig. 3 Developed parallel gripper.](image3)

**Experiment**

Developed gripper can grip fragile, soft and various shaped objects. Moreover, developed gripper can firmly grip objects, and transport an object in high speed.

![Fig. 6 Gripping the various shape of the object by developed parallel gripper.](image6)

**Fig. 3 Developed parallel gripper.**

**Fig. 4 Changing stiffness of fingertips by moving permanent magnet.**

**Fig. 5 Detail of flexible membrane.**

**Fig. 6 Gripping the various shape of the object by developed parallel gripper.**