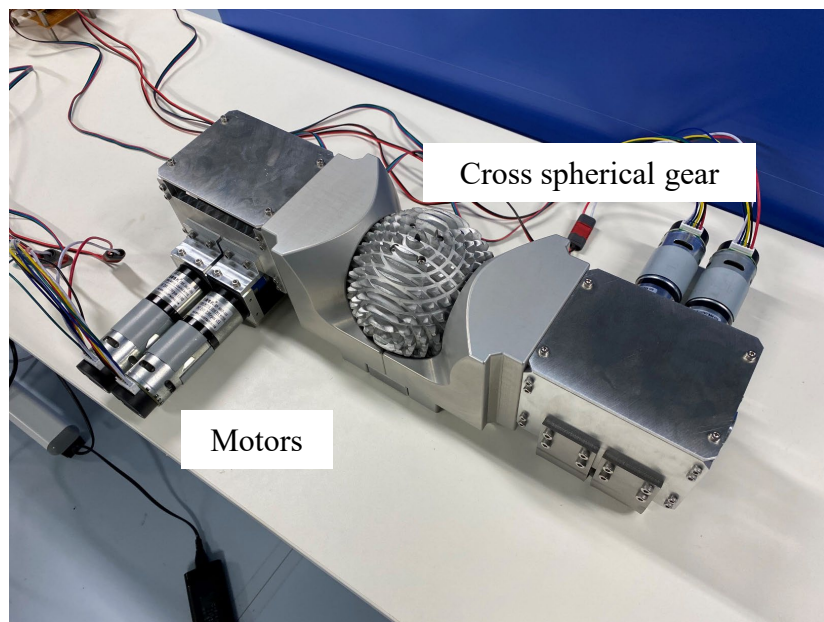
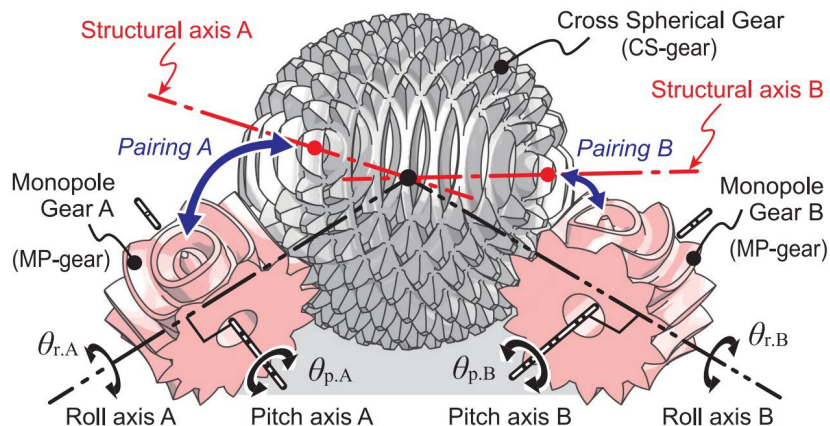


Spherical gear for robotic arm and various applications

[Keywords: Spherical gear, Robotics]

Professor Riichiro Tadakuma



Content:

The spherical gear named “ABENICS” was invented and developed by Dr. Kazuki Abe who was supervised by Prof. Riichiro Tadakuma during 2018-2020 as a Ph.D. candidate at graduate school of Yamagata University.

The spherical gear has two gear columns that are perpendicular to each other on the common spherical surface. It has a circular pole structure and the same pole structure on the monopole gear always mesh each other.

The differential drive mechanism rotates the monopole gear around Roll and Pitch axes, and these torques are transmitted to the spherical gear. The power transmitted from two monopole gears are combined on the spherical gear to move it to arbitrary directions.

With this configuration, three degrees of freedom of the spherical gear around Roll, Pitch and Yaw axes without any limitation can be realized.

This spherical gear can be applied to the joint of the robotic arm, and various applications to move tools smoothly in narrow space.

The metallic spherical gear has been developed as shown in the picture.

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