

Actuation system for highly underactuated gripping mechanism

This invention provides an actuation system for a highly underactuated gripping mechanism with ten degrees of freedom, which requires only two actuators, one for actuating the opening and closing of three fingers and the other for the orientation of two rotatable fingers with synchronization. Underactuation between the fingers is provided by a one-input/three-output differential which is associated with an orientation mechanism so that an orientation-fixed finger is deactivated when the two orientatable fingers are rotated to face each other for a pinch grasp. Each finger is enabled to be self-locked in its closing and opening action when the power is off. In one embodiment of the invention, a planetary gearing system is used for the differential. In another embodiment, a Geneva mechanism is used for the orientation transmission, and a fastening interface using an indexing ring is provided to connect an external driving apparatus.
