

Developing an Electric Wheelchair with a Single-Step Climbing Mechanism

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Research Topics

- Achievement of single-step climbing function using six-wheel structure
- Establishment of communication between circuits using USB
- Development of motor control algorithm for four-wheel drive running

Research Seeds

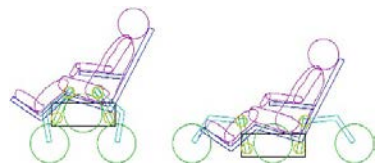
- Development of element technology necessary for achieving electric wheelchairs

When using wheelchairs and similar devices, barriers such as stairs can hinder movement. Although barrier-free structures have become widespread recently, field surveys [1] done in 2001 circumstances clarify that many small differences of single steps between the pavement and the roadway remain. Because slopes are associated with most multi-step differences, if small differences of only a single step could be surmounted, the electric wheelchair users' range of action could be extended enormously.

Consequently, electric wheelchairs with single-step climbing function are developed in this laboratory (Figs. 1 and 2). The prototype being developed now achieves single-step climbing function by adopting a six-wheel structure. Moreover, coexistence of the indoor use and the commuter use is attempted by transformation of the device between usual posture of four-wheel contact and the running posture of six-wheel contact.

This prototype has been developed with the intention of trial drive realization. It is a feature of the control system to use many subsystems and to use internal communication using USB.

[1] Tamura, Kondo, Kumagai, Oizumi: Development of a single step climbing mechanism for electric wheelchair (1st Rep.), SPTE, (2002)



Usual Running/Climbing
Fig. 1 Structure of prototype.



Fig. 2 3D model of prototype.

Related Technology

- Brushless DC motor control technology
- Power electronics technology
- Built-in microcomputer technology