

Stability analysis of electrical powered wheelchair-mounted robotic-assisted transfer device

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- Aim
 - Investigate stability of newly developed Strong Arm.
 - Attaches and integrates with electrical powered wheelchair to assist with transfers.
- Relevance
 - An easy-to-use robotic system that assists with transfers could significantly increase quality of life and independence for people with disabilities.

Method

- Analyzed and verified stability of Strong Arm system through experiments:
 - Applying different loads.
 - Using different system configurations.

Results

- Model predicted system's center of mass distributions very well compared with experimental results.
- When real transfers were conducted with 50 and 75 kg loads and an 83.25 kg dummy, current Strong Arm could transfer all weights safely without tip-over.

Conclusion

- Our modeling:
 - Accurately predicted system stability.
 - Is suitable for developing better control algorithms to enhance device safety.