UNIVERSITY OF TWENTE.

RAM

LOPES

The LOPES can be used to assist patients (e.g. stroke, SCI) during walking or assess gait impairments. It has eight powered degrees of freedom (hip flexion/extension, hip abduction/aduction, knee flexion/extension, pelvis forward/backward and pelvis mediolateral). Other degrees of freedom are left free. The robot is attached with a minimal amount of clamps which results in a short donning and doffing time. It is admittance controlled and allows for control over the complete spectrum from low to high impedance. Kinematics and interaction forces are measured by the device and it can be easily combined with EMG measurements. It allows to test new controllers (e.g. for exoskeletons) or assessment algorithms in a safe environment.

Key Features

- Short donning and doffing time
- 8 powered degrees of freedom
- Integrated sensors to measure kinematics and interaction forces
- Admittance controlled: control from low to high impedance possible
- Simulink development library, allowing easy integration of new control algorithms

Possible Applications

- Controller development for exoskeletons
- Human-Robot Interaction
- Gait assessment
- Gait training
- Human-in-the-loop testing

Access information

Corresponding infrastructure	University of Twente Department of Robotics
Location	Hallenweg 15, 7522 NH Enschede, Holland
Unit of access	Working day

Technical specifications

Maximal Torque (varying per joint)	60-66 Nm
Control	Admittance control
Other free degrees of freedom	9
Powered degrees of freedom	8
Donning time	5-15 minutes
Maximal rendered stiffness	1500 Nm/rad

Additional information

The design and control of LOPES is described in detail in the PhD thesis of Jos Meuleman
http://josmeuleman.nl/thesis.html

Information on LOPES related project can be found at
https://www.utwente.nl/en/et/be/research/projects/lopes