

## Enhancing Human Mobility Exoskeleton Comfort Using Admittance Controller

**Authors :** Alexandre Rabaseda, Emelie Seguin, Marc Doumit

**Abstract :** Human mobility exoskeletons have been in development for several years and are becoming increasingly efficient. Unfortunately, user comfort was not always a priority design criterion throughout their development. To further improve this technology, exoskeletons should operate and deliver assistance without causing discomfort to the user. For this, improvements are necessary from an ergonomic point of view. The device's control method is important when endeavoring to enhance user comfort. Exoskeleton or rehabilitation device controllers use methods of control called interaction controls (admittance and impedance controls). This paper proposes an extended version of an admittance controller to enhance user comfort. The control method used consists of adding an inner loop that is controlled by a proportional-integral-derivative (PID) controller. This allows the interaction force to be kept as close as possible to the desired force trajectory. The force-tracking admittance controller modifies the actuation force of the system in order to follow both the desired motion trajectory and the desired relative force between the user and the exoskeleton.

**Keywords :** mobility assistive device, exoskeleton, force-tracking admittance controller, user comfort

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