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Elektrotechnik-Elektronik-Informationstechnik

EEI KOLLOQUIUM

Exosuits: towards a symbiotic assistive technology?

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21.02.2021, 14:00 Uhr
Zoom-Meeting: https://fau.zoom.us/j/64835567442

Soft wearable exosuits have been introduced in the last decade as possible candidates to overcome the limitations from devices using rigid structures: the exoskeletons. Despite the Exosuits initially promised tangible improvements, yet their soft wearable architecture presents strong drawbacks, placing this technology more in a complementary position rather than on a higher step of the podium respect to their predecessors.

Motivations can be found in their soft structure which not only undershoots in terms of assistance delivery respect to the exoskeletons, but also introduces non-linear dynamic behaviours making difficult the formalization of a robust control implementation and substantially hampering the matching with the wearer´s biomechanics.

During my speech I will introduce the progress from our research on soft wearable exosuits for upper and lower limb, by presenting novel solutions on mechanical design of both harness and actuation, novel implementation of control strategies to master the non-linear behaviours. I will discuss in details how using biosignals by means of a realtime myoprocessor based on musculoskeletal dynamics which provide a symbiotic interface between the exosuit and the user and compared such a solution with a classical approach based on admittance control. I will introduce our novel solutions in lower limb assistive devices using non-linear adaptive oscillators and machine learning.