

## Mechanical design of an exoskeleton for rehabilitation of lower limbs

**Bartosz Stańczyk, Dariusz Grzelczyk, Olga Jarzyna, Jan Awrejcewicz**

*Abstract:* Impairment of the locomotion system is a serious medical and social problem. Its prevalence is constantly growing and traditional forms of rehabilitation often lead to occupational health problems of physiotherapists. Therefore, it is important to design medical devices aimed at replacing the laborious work of therapists and helping the patients restore their mobility. This paper presents mechanical design of a prototype of a 10-DoF exoskeleton for rehabilitation of lower limbs and gait. Aside from motions in the hip, knee and ankle joints, additional movements of the upper body and toes are also facilitated. The length of particular elements of the device can be adjusted to a patient.

---

<sup>1)</sup> Bartosz Stańczyk, Ph.D.: Politechnika Łódzka K16, Pawlikowice, Poland (PL),  
Bartchez@gmail.com.

<sup>2)</sup> Dariusz Grzelczyk, Ph.D.: Politechnika Łódzka K16, Stefanowskiego 1/15, Poland (PL),  
Dariusz.grzelczyk@p.lodz.pl.

<sup>3)</sup> Olga Jarzyna, M.Sc. (Ph.D. student): Politechnika Łódzka K16, Stefanowskiego 1/15, Poland (PL),  
Olga.jarzyna@dokt.p.lodz.pl.

<sup>4)</sup> Jan Awrejcewicz, Professor: Politechnika Łódzka K16, Stefanowskiego 1/15, Poland (PL),  
jan.awrejcewicz@p.lodz.pl.