



## **TWO-DEGREE ADJUSTABLE EXOSKELETON FOR ASSISTANCE OF THE HUMAN ARM USING A MECHANICAL SYSTEM OF FAST ASSEMBLY AND UPGRADABILITY**

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*Abstract- Stroke affects about 975,000 people annually. Currently different robotic systems are used, such as exoskeletons that support motor rehabilitation, where they sometimes increase the patient's possible recovery rate. But these systems are expensive and often require adequate locations for therapy routines. This article offers the mechanical design of an exoskeleton concept for human upper limbs that allows the attachment to the arm and forearm, offering protection, torque, and movement, plus the possibility to adapt to different arm sizes. The biomechanics of the human arm, the kinematics required by the exoskeleton, different design criteria for this type of system, the CAD model, and the simulation of a robotic exoskeleton with an active and passive degree of freedom are considered. As a main result, the exoskeleton includes the biomechanics of the human arm so that its kinematics allow for adequate human arm movements for providing mechanical assistance, data acquisition and analysis, but also safety.*

**Index terms:** Active orthosis, Exoskeleton, Interactive adaptation, Wearable-robot