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Tesis: **"DESIGN AND CONSTRUCTION OF ROBOTIC DEVICE FOR REHABILITATION"**

Resumen:

Strokes are the second largest cause of disability worldwide after dementia. This is caused by an interruption of blood flow to the brain. It results in brain cell damage and could be fatal. A stroke typically manifests itself with the sudden onset of local neurological deficits, such as partial loss of movement, sensory deficit, or difficulties with speech. Due to the necessity of people that suffer this condition to receive an adequate medical service, delicate and precise processes, and the lack of doctors and specialists, some alternatives has been proposed to solve this issue. One of them is the introduction of robots to medical field, with the purpose of help them to do their daily activities easily. The exoskeletons are part of such devices, the aim of this work is to propose a prototype of an exoskeleton for upper limb rehabilitation. In recent years, interest on exoskeletons has increased, it has paid attention specially to ones that offer a better rehabilitation therapy and also that provide suitable health care to people that need assistance, not only in hospitals, also in their own houses but this devices are very expensive yet. In this work it is presented the modeling and control of a 1-DOF robotic device (exoskeleton) for rehabilitation of upper limb aka exoskeleton, the interaction between human and robot is considered unknown so to estimating this interaction a nonlinear observer is designed. This observer is based on sliding mode and the control is designed by using the Lyapunov method for nonlinear non autonomous systems. Some simulation are presented which show the effectiveness of the observer and control.