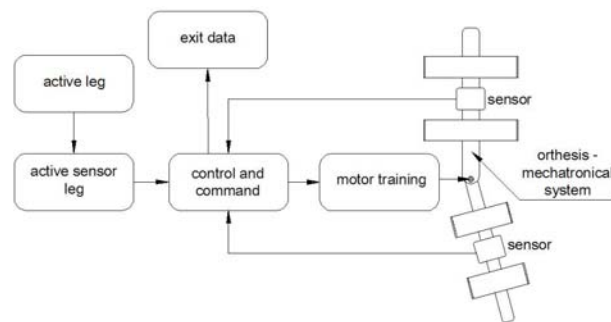


# GENERAL CONSIDERATIONS ABOUT AN ACTIVE KNEE REHABILITATION ORTHOTIC DEVICE

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This paper presents a new, intelligent and portable active knee rehabilitation orthotic device designed to train stroke patients to correct knee hyperextension during stance and stiff-legged gait (defined as reduced knee flexion during swing). The knee brace provides variable damping controlled in ways that foster motor recovery in stroke subjects. Furthermore, the knee brace is used to assist in knee control during swing, i.e. to allow patients to achieve adequate knee flexion for toe clearance and adequate knee extension in preparation to heel strike. By the reason of complexity theme approached, we consider that the research activities are very varied and they involve knowledge about biomechanics, mechatronics and robotics, analyses, numerical shaping and simulation, assisted design and many also, therefore this paper may be considered a pluridisciplinary work.

In this paper we want to project, realize and implement a mechatronical system (an intelligent robotized orthosis), what shall can help the persons finder out in a certain therapy regenerative neuro-motory. We follow here in chief the knee-joints and the elbow, but the system can be adapted to hand joint, or the ankle, the shoulder or the thigh. Due to the fact that the device on which want to achieve helps in the execution human functions, respectively one locomotors, can say as he shall have the roles of locomotory orthesis. Thence, our intention is to create a mechatronical robotized system what has a role of orthosis, does as this project to heads a different importance in special for certain categories of persons. Here advert to us the which persons suffered an accidents and missed fractionally or total a possibility moved his foot a hand; Which persons suffered surgical interventions and which need a technique regenerative the locomotion; Which sportsman need his practices the medical recovery after hurt it; Elderly which persons require the exercises of neuromotory rehabilitation; Copies with neurodystrophy; Which persons from different causes and they missed provisionally the locomotory function etc.



In the adoption of optimum model is due to consider several factors:

- a. The bipedal representation;
- b. The joints modeling;
- c. The establish of the constructive scheme.

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## References

- [1] Krebs, H.I. - Robotic applications in neuromotor rehabilitation, Robotica 21, p. 3-12, 2003
- [2] Fricconneau, J.P. et al. - Mechatronics in Medecine, Healthcare and Rehabilitation, IMechE Seminar - Mechatronics in Medicine, Healthcare and Rehabilitation - Nov 2003
- [3] NIDRR Projects - Research in the New MillenniumNews from the National Rehabilitation Information Center, Vol 7, No 2, March 2005
- [4] Weinberg B. e.a.- Design, Control and Human Testing of an Active Knee Rehabilitation Orthotic Device, 2007 IEEE International Conference on Robotics and Automation, Roma, Italy, 10-14 April 2007