# Simulating the human motion under Functional Electrical Stimulation using the HuMAnS toolbox

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## Summary

Mathematical models of the skeletal muscle can support the development of neuroprotheses to restore functional movements in individuals with motor deficiencies by the mean of Functional Electrical Stimulation (FES).

Since many years, numerous skeletal muscle models have been proposed to express the relationship between muscle activation and generated force. One of them (Makssoud et al [2]-[3]), integrates the Hill model [5] and the physiological one based on Huxley work [4] allowing the muscle activation under FES. We propose in this paper an improvement of this model by modifying the activation part.

These improvements are highlighted through the HuMAnS toolbox [1] (Figure 1) using a 3D biomechanical model of human named Human 36 which has 36 DOF. This article describes this toolbox and the software implementation of the model. Then, we introduce the simulation results of the knee joint actuated by the muscle group (Quadriceps/Harmstring) using FES (Figure 1).

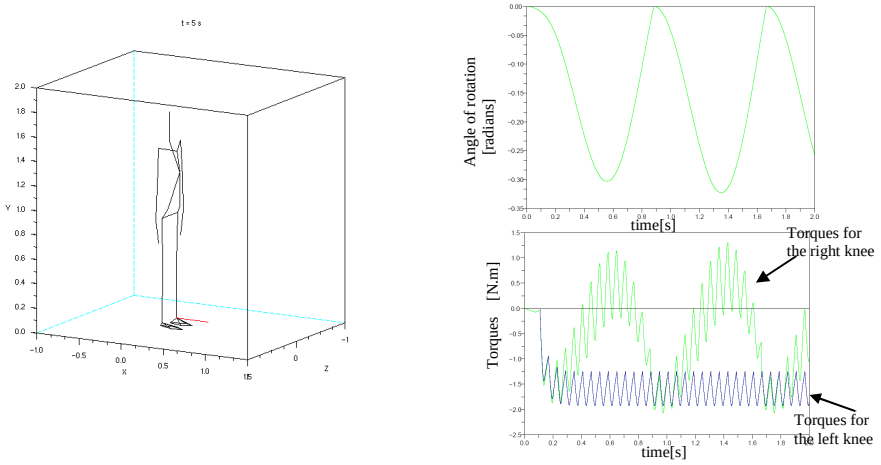


Figure 1. The Human 36 model and some results of the simulation