UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

# Thesis Project Form

**Title (tentative):** Development of proportional algorithm for prosthetic control

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## Description

**Motivation and application domain**

Upper limb amputation entails a drastic loss of hand functionality. Prostheses aim to restore the lost functionality and thereby restore the independence of people with limb loss. A crucial part of prosthetic control is proportionality â€“ the ability to modulate the speed of various degrees of freedom of a prosthesis. However, current proportional control algorithms only work for a few degrees of freedom and are not yet able to reproduce the natural proportionality of a biological hand.

**General objectives and main activities**

The main objective is to propose and implement proportional control algorithms that improve on the current standard (e.g., increased resolution and support for simultaneously controlled degrees of freedom).

The main activities include:

- A short literature study for the student to familiarize with the current state of research in proportional prosthetic control
- Development of proportional algorithm
- Implementation of algorithm in Matlab
- Evaluation of algorithms on able-bodied participants and participants with amputation
- Analysis of experimental results

**Training Objectives (technical/analytical tools, experimental methodologies)**

This thesis aims to improve on the current standard of proportional prosthetic control and thereby increase the functionality of prosthetic limbs as proportionality is necessary for both fine and accurate, as well as for fast and reliable grasp and finger movement. In turn, this will allow patients to control their prosthetic limb more naturally and efficiently.

**Place(s) where the thesis work will be carried out:** Center for Bionics and Pain Research, CBPR LÃ¤nsmansgatan 28, MÃ¶lndals sjukhus 431 30 MÃ¶lndal Sweden

## Additional information

**Maximum number of students:** 1

**Financial support/scholarship:** erasmus