



MASTER ON NUMERICAL METHODS IN ENGINEERING

THESIS PROPOSAL

Name of the student	Lisandro Agustin Roldan
Title of the Master's thesis	Computational model for the chemo-mechanical mechanism in wound healing

Name of the supervisor	Pablo Saez Viñas
Department	ECA - Departament d'Enginyeria Civil i Ambiental

Summary:

Multicellular organisms are able to repair itself by means of complex biological phenomena. The process by which the defect self-repair is called wound healing. One of the main mechanism in charge of wound closure is the so called contractile cables. Apart from the extensive experimental literature, no many mathematical models of this process has been developed so far. The aim of this thesis is to propose a mathematical model for the creation and active behavior of the actin cable that allow to simulate the entire wound closure.

Main tasks:

- Model the coupling between calcium signals, actomyosin flow and non-linear deformation and implement it on a FEM code.
- Model the contraction of the actomyosin cable and implement it on a FEM code.
- Calibration between model and experimental data.
- Execute and analyze relevant examples.
- Write the methodology and results.

Additional remarks:

Date: 01/04/2017

Student's signature

Supervisor's signature