

MODELING HEALING OF EPIDERMAL WOUNDS AND BONE FRACTURE

PROJECT AIM

The aim is simulate bone healing and healing of epidermal wounds.

PROGRESS

A mathematical model involving wound contraction (as a result of formation of a fibroblast tissue in a deep wound), angiogenesis (formation of capillaries) and wound closure (closure of the epidermis) has been formulated in terms of coupling of the processes. The model consists of visco-elastic equations with a set of nonlinear diffusion-reaction equations. Finite element methods combined with IMEX time integration schemes have been used.

DISSERTATIONS

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SCIENTIFIC PUBLICATIONS

1. F.J. Vermolen, E.M. van Aken, J.C. van der Linden, and A. Andreykiv, A Finite Element Model for Bone Ingrowth into a Prosthesis, in: Numerical Mathematics and Advanced Applications: Proceedings of ENUMATH 2007, the 7th European Conference on Numerical Mathematics and Advanced Applications
2. E. Javierre, F.J. Vermolen, C. Vuik, and S. van der Zwaag, Numerical Modeling of Epidermal Wound Healing, in: Numerical Mathematics and Advanced Applications: Proceedings of ENUMATH 2007, the 7th European Conference on Numerical Mathematics and Advanced Applications.
3. F.J. Vermolen & E. Javierre. On the construction of analytic solutions for a diffusion-reaction equation with a discontinuous switch mechanism, Report at DIAM (08-24), Delft University of Technology.

PROJECT LEADERS

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RESEARCH THEME

Complex dynamics of fluids

PARTICIPANTS

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COOPERATIONS

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DCMAT. Senternovem (NWO)

1st 100% 2nd - 3rd -

START OF THE PROJECT

2003

INFORMATION

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