Editorial

The advent of digital computers has greatly changed the landscape of mechanics. In fact, this holds true not only for the field of mechanics itself, but also for the interface between mechanics and materials science, where great progress has been made. Nowadays, the availabil ity of non-linear finite element software enables the experimental scientists to quantify the influence of the testing machine on the behaviour of his specimen. Especially the exact boundary conditions, i.e. how the load is precisely applied, may play a major role in the eventual failure mode of the specimen. Indeed, without computational tools it is hardly possible to set up constitutive models for engineering materials since the behaviour of specimens will always be non-homogeneous, no matter how carefully the loading is applied. Therefore, semi-inverse modelling techniques are needed in order to extract proper material models and reliable parameters for these models. Such approaches, although of a completely different kind, are described by L. J. Sluys and M. A. N. Hendriks in the first two articles of this special issue of HERON.

But classical problems of mechanics can nowadays also be solved in a more thorough and general manner. This does not preclude the use of sophisticated theories of mechanics. On the contrary, the fruits of such theories are only now harvestable to their full extent. Examples concern shell theory to which the third article of this issue, written by A. Bout and A. van Keulen, is devoted; interface problems, which are treated in two articles by J. C. J. Schellekens and J. G. Rots respectively; and flow and fluid-structure interaction problems which are described in the contribution by D.G. Roddeman. Last but not least, the computer has opened up the possibility of simulating the building process, in the sense that the influence of the order of construction can be analysed by means of the finite element method. Examples are given in the final article by P. van den Berg and M. A. T. Visschedijk.

Although this special issue of HERON already contains a wide variety of research topics, these form but a minor part of the rapidly expanding field of *computational mechanics.* Indeed, it is impossible for a single research group to keep track of all developments, let alone to actively generate novel and innovative ideas on the full spectrum of computational mechanics and computational modelling. Yet, it is of pivotal importance for universities and technological institutes to be in the forefront of modern developments and to have the possibility of actively contributing to them. To meet this challenge the three Dutch technical universities (Delft University of Technology; Eindhoven University of Technology; Twente University of Technology), three major technological institutes active in applied engineering research (TNO Building and Construction Research; Delft Geotechnics; Delft Hydraulics) and the University of Limburg (Faculty of Health Sciences) have, in a joint effort, established the DIANA Foundation, which aims at integrating all results of research into computational mechanics and computational modelling that can be made operational in the DIANA Finite Element Program. The goals are to ensure that research findings are not lost after projects are completed and that operational results of research in computational mechanics are made available to the engineering community. Some results of these efforts are reflected in the contents of this special issue.

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