



Editorial

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High-Performance Computational Hydrodynamics

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Introduction

Hydroinformatics may be a branch of informatics which concentrates on the appliance of data and communications technologies (ICTs) in addressing the increasingly serious problems of the equitable and efficient use of water for several different purposes. Growing out of the sooner discipline of computational hydraulics, the numerical simulation of water flows and related processes remains a mainstay of hydroinformatics, which inspires attention not only on the technology but on its application during a social context.

On the technical side, additionally to computational hydraulics, hydroinformatics features a strong interest within the use of techniques originating within the so-called AI community, like artificial neural networks or recently support vector machines and genetic programming. These could be used with large collections of observed data for the aim of knowledge mining for knowledge discovery, or with data generated from an existing, physically based model so as to get a computationally efficient emulator of that model for a few purpose.

Hydroinformatics recognises the inherently social nature of the issues of water management and of deciding processes, and strives to know the social processes by which technologies are brought into use. Since the issues of water management are most severe within the majority world, while the resources to get and develop technological solutions are concentrated within the hands of the minority, the necessity to look at these social processes are particularly acute.

Hydroinformatics draws on and integrates hydraulics, hydrology, environmental engineering and lots of other disciplines. It sees application within the least points in the water cycle from atmosphere to ocean, and in artificial interventions therein cycle like urban drainage and water system systems. It provides support for deciding in the least levels from governance and policy through management to operations.

Hydroinformatics features a growing world-wide community of researchers and practitioners, and postgraduate programmes in Hydroinformatics are offered by many leading institutions. The Journal of Hydroinformatics provides a selected outlet for Hydroinformatics research, and therefore the community gathers to exchange ideas at the biennial conferences. These activities are coordinated by the joint Hydroinformatics Section

The “social requirements” are real: the more that society becomes aware that it depends upon water, the more it understands that water is central to sustained development at the extent of a rustic and even a subcontinent. These problems transcend hydraulics and hydrology. While until recent decades, hydraulics and hydrology were determining these questions; now these problems largely transcend the sphere of influence of hydraulic and hydrology. On the one hand, the concept of “stewardship” exercised by humanity (that is, its responsibility for the conservation or sustainable management of natural resources) has shifted the decision-making power from hydro engineers to politicians, ecologists, NGOs, the general public generally, and therefore the media. On the opposite hand, the technical ways during which investment decisions are transformed into projects and therefore the everyday technical management of water systems are more and more determined by corporations like water companies, by basin authorities, etc.

Classical hydro engineering (hydraulics, hydrology and related research), seen from a company or political point of view, along side meteorology and water quality, deals with “just” one aspect of the entire problem. As a consequence, the results of hydraulic research, also as core modelling software, are ever sooner “encapsulated” and in such encapsulated forms integrated in larger systems or “added value networks”. they need to be seen within the context of a more comprehensive exchange of data concerning the important world water-based assets and therefore the interests and intentions of their various stakeholders.

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