Critical review presentation of

Modelling fluvial processes

using the finite volume method

by Ernest Bladé

Communication Skills I

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Modelling fluvial processes using the finite volume method, Ernest Bladé

The following review gives a critical presentation about the seminar "Modelling fluival processes using the finite volume method" held by Ernest Bladé. It took place on Wednesday, November 23rd, 2016 in O.C. Zienkiewicz Conference Room, C1 Building, UPC Campus Nord, Barcelona, at 12 p.m.

The speaker Ernest Bladé Castellet (PhD) is the Deputy Director of the Institut Flumen at the Polytechnic University of Catalonia UPC in Barcelona (Teaching and Research). His fields of expertise are Civil Engineer and Hydrology.

With the topic "Modelling fluival processes using the finite volume method" Mr Bladé wants to give an understanding of the practical implementations of the finite volume method (FVM) based numerical schemes to solve fluival processes. Also does he want to depict the possibilities of linking this type of schemes for additional results of interest to solve engineering problems.

Mr. Bladé starts with an introduction of a software for 2D Finite Volume numerical simulation tools for River Flow and Fluvial Process and a short overview about more possibilities the software offers. He then continues with explaining numerical schemes with examples of equations and their theoretical background. He tells the audience the importance of the FVM, that as a discretization technique for especially physical conversation law based partial differential equations (PDE's) it is in common use for discretizing computational fluid dynamics equations. It is considerably used for describing the river flow by solving the Shallow Water equations. Also he explains how the FVM is solving processes. To discretize equations it uses a volume integral formulation of the problem with a finite partitioning set of volumes. After that, he starts to show other possible processes which can be solved with the help of the FVM based numerical schemes. Also river dynamic processes besides the water flow can be colligated to a FVM based numerical code. Some can be constituted through conversation law – for example sediment transport, turbulence, hydrologic processes as precipitation or rain, non-newtonian fluid flows – others cannot – for example wood transport, habitat evaluation, flood hazard.

Right from the beginning Mr. Bladé asks the audience if they are familiar with hydraulics. Because not everybody is, he explains every unknown variable and the theoretical background of every equation in detail. To facilitate the understanding of the topic and to catch the interest of the audience, he uses the blackboard to draw sketches of what he is talking about. By showing many examples for his used schemes he explains how good or how bad they show the reality and compared good and bad solutions. Those pictures are colored and sometimes animated to catch the audiences' attention. Every sheet contains at least one picture. Also almost every sheet contains at least one equation. This makes the presentation a bit tiring. But because Mr. Bladé seems to recognize that he skips some equations which he thinks are not necessary to explain in detail. He speaks free during the whole presentation. He stops in time but has no last sheet, what makes the stop a bit surprising. At the end he answers questions satisfyingly.

Mr. Bladé gives a good overview about his topic and which possibilities you have by using the Finite Volume Method. He explains everything in consideration for the people who are not familiar with this topic. His aim to give an understanding of the practical implementations of the FVM based numerical schemes to solve fluival processes and the description of the possibilities of linking this type of schemes for additional results of interest to solve engineering problems is attained in a good way.