Communication Skills M.Sc.

Computational Mechanics

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Critical review

From "Modelling fluvial process using the finite volume method", November 23,2016

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This review is based on modelling fluvial process using the FVM and explanation how to obtain hydrodynamics shallow water equations. The FVM is in common use for discretizing computational fluid dynamics equations, and in the last decades has been extensively used for solving the Shallow Water equations which describe river flow.

There is a wide range of application when using numerical models in sedimentation engineering for predicting flow and sediment transport. The complexity of geometry and sediment properties increases the number and complexity of the numerical algorithms and consequently the computational time. Due to the increasing computer power in recent years, numerical models are more frequently used in sedimentation engineering. It is noted the advantage of naturally conservative and also described they are quiet intuitive. Although the prediction of flow and sediment transport is reliable, for some complex flow situations there are some considerable drawbacks.

This talk is about the practical implementation of FVM based numerical schemes to solve fluvial processes and the possibilities of linking this type of schemes for additional results of interest to solve engineering problems. The finite volume method (FVM) is a discretization technique for partial differential equations, especially those that arise from physical conservation laws.Hence,he spoke point of mathematically view with big formulas and numerical schemes to consider upstream and downstream.Sometimes ,it is not better to understand clearly and throughout the main points regarding topic.

As a result of the increasing demand for prediction of 3D flow and corresponding sediment transport, he presented a numerical model solving the three-dimensional Reynolds-averaged Navier-Stokes equation. This process is initialized by the centrifugal forces accelerating water particles on the water surface being then transported toward the outer part of the bend. This causes a pressure difference between the inner and the outer streamline of the bend flow, being balanced by a near bed current pointing toward the inner part of the bend.

Apart from the water flow, several other processes related to river dynamics (sediment transport, turbulence, hydrologic processes as precipitation or rain, non-newtonian fluid flows) can also be described through conservation lows.