

## **DIFFERENTIAL QUADRATURE TECHNIQUES FOR SOLVING SHALLOW WATER FLOW USING SPREADSHEETS**

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### **ABSTRACT**

There has been a growing interest in using the differential quadrature method over the last 15 years and spreadsheet simulation modeling field of water resource modeling. This Current work provides an unsteady surface water modeling using spreadsheet simulation (USMS) model for (solving surface water problems where the user can edit the upstream discharges of the river to get the discharge at any point on the channel automatically. The present project is proposing applying the differential quadrature method on the simulating flow in one dimension prismatic open channel through solving the diffusion wave models. Their high specific accuracy and stability for solving PDE is one of the main reasons for choosing them. USMS is a practical method and introduction to unsteady surface water modeling that uses spreadsheets instead of conventional surface water model codes. Unsteady flow, variable boundary and initial conditions, one dimension prismatic open channel, are evaluated in the USMS. Various flow management scenarios could be studied by obtaining the surface water level of the different times. In order to verify the DQM solution and the USMS, flood data found in published paper Bajracharya et al., 1996) is used as a benchmark case and the results of DQM solution is compared with Crank Nickerson method and McCormick schemes which are the most two accurate implicit and explicit Finite Difference schemes. DQM solution shows good agreement with benchmark case.

**KEYWORDS:** Differential Quadrature, Saint Venant equation, Spreadsheets, Preissmann and McCormick Scheme