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MASCARET – AN OPEN SOURCE 1D SIMULATION CODE FOR FLOW HYDRODYNAMIC WITH A GENERIC APPLICATION PROGRAMMING INTERFACE

Jean-Marc Lacombe  
EDF R&D, jean-marc.lacombe@edf.fr

Fabrice Zaoui  
EDF R&D

Nicole Goutal  
EDF R&D

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MASCARET – AN OPEN SOURCE 1D SIMULATION CODE FOR FLOW HYDRODYNAMIC WITH A GENERIC APPLICATION PROGRAMING INTERFACE

Jean-Marc LACOMBE, Fabrice ZAOUI and Nicole GOUTAL

EDF R&D - 6 quai Watier 78401 CHATOU - FRANCE
Email: jean-marc.lacombe@edf.fr

ABSTRACT

MASCARET is an open source software dedicated to the simulation of one-dimensional flow hydrodynamic in open channels networks (http://www.openmascaret.org). It is distributed under the GNU general public license. The code provides a generic Application Programming Interface (API) which allows an easy integration in frameworks or coupling with other simulators.

This API allows the classic main steps of a simulation: initialization, time step integration, and finalization. In addition, it is possible to access and modify all the variables and parameters disseminated in the code through a single interface. It is also possible to obtain all the information about these variables (metadata): part of the numerical state or model, dimension, type and description, etc… The API controls all the calculations and performs backup or restoration of intermediate states. Finally MASCARET API is implemented in a way that a high level of performance is maintained. For instance, the API is provided in the C language but also in Fortran 77 simplifying wrappers creation.

With the help of its interface, MASCARET is already integrated in several numerical computing environments like Scilab (http://www.scilab.org) or Salome (http://www.salome-platform.org) and it is also OpenMI (http://www.openmi.org/) compliant. In the final paper, some relevant applications of the MASCARET API will show the high interest of such an open-source tool for the hydrodynamic community.