U.PORTO

Venue:

Faculdade de Engenharia da Universidade do Porto
Rua Dr. Roberto Frias, s/n, 4200-465 Porto
PORTUGAL

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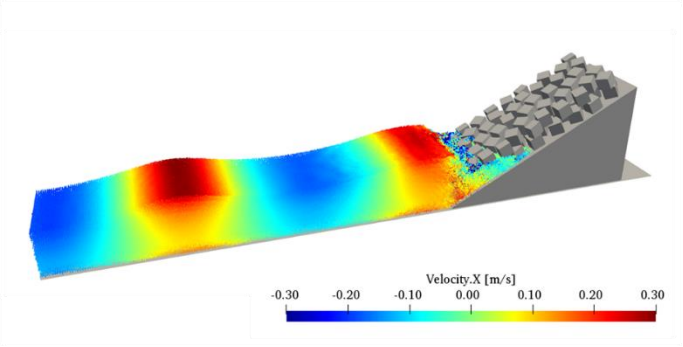
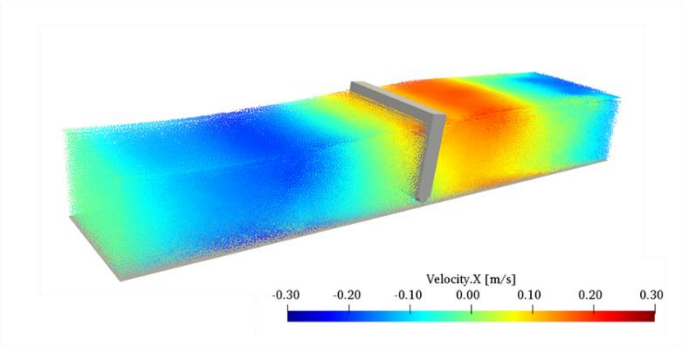
FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

Introduction to SPH Modelling Using DualSPHysics Code

7th - 8th February 2023





Organised by:

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Prof. Alejandro J. C. Crespo (Universidade de Vigo, Spain)
Dr. José M. Domínguez (Universidade de Vigo, Spain)
Dr. Corrado Altomare (Universitat Politècnica de Catalunya, Spain)
Iván Martínez Estévez (Universidade de Vigo, Spain)

Presentation

The numerical modelling can represent a useful and complementary tool to physical model tests. Sophisticated tools are now at a formative stage and here we are actively developing the novel, flexible numerical technique **Smoothed Particle Hydrodynamics (SPH)**.

As a meshless and Lagrangian technique, SPH is ideally suited to fluid and solid mechanics with highly nonlinear deformation and is opening new avenues of activity in several areas, notably fluid-structure interaction, multi-phase flows and importantly, engineering application and design. SPH describes a fluid by replacing its continuum properties with locally smoothed quantities at discrete Lagrangian locations. SPH has become increasingly popular in recent years as a **novel technique to model the violent hydrodynamics** in wave breaking, wave-structure interaction, floating objects, etc.

The **DualSPHysics** code has been developed to use **SPH for real engineering problems**. DualSPHysics is open source and can be freely downloaded from the website www.dual.sphysics.org. The code can be proposed as **complementary tool to physical model experiments** for the preliminary design of structures exposed to the action of violent flows.

The code comes with dedicated pre-processing software which can use a whole range of different input files for the geometries including CAD, STL, PLY files, etc., making setting up simulations straightforward. Advanced post-processing tools enable users to measure physical magnitudes of any flow property at arbitrary locations in the domain.

Contents of the Course

The first part of the course will be focused on the general description of the **SPH methodology**, functionalities implemented in the DualSPHysics code and examples of **application in coastal engineering and marine energies**.

The second part includes a **hands-on session with examples** of dam-breaks, wave propagation, free and moored floating objects. This practical session includes pre-processing, execution and post-processing of the results (and validation with experimental data).

Registration

If you are interested in attending the course, please fill the form. The rate is **150 €** (**100€ for students**), which will include all refreshments and lunch during the whole event, and the course dinner. Registration deadline is **15th December 2022**.

Programme

7th February 2023

• **Welcome & Presentation of the Course** Francisco Taveira Pinto	**09.00 – 09.15**
• **Introduction to SPH** Moncho Gómez Gesteira	**09:15 – 09:55**
• **The DualSPHysics code** José M. Domínguez	**09:55 – 10:35**
Coffee break	**10:35 – 11:00**
• **Applications in engineering** Corrado Altomare	**11:00 – 11:30**
• **Applications in engineering II** Alejandro Crespo	**11:30 – 12:00**
• **Introduction to Practical Session** DualSPHysics team	**12:00 – 12:30**
Lunch	**12:30 – 13:30**
• **Practical Session 1: First steps** DualSPHysics team	**13:30 – 16:30**
Course Dinner	**20:00**

8th February 2023

• **Practical Session 2: Breakwaters** DualSPHysics team	**09:30 – 12:30**
Lunch	**12:30 – 13:30**
• **Practical Session 3: WECs** DualSPHysics team	**13:30 – 16:30**
Closure	**17:00**