PIN POLO UNIVERSITARIO CITTÀ DI PRATO

SERVIZI DIDATTICI E SCIENTIFICI PER L'UNIVERSITÀ DI FIRENZE

How to get to PIN the campus of the University of Florence in Prato

Florence is well-connected with the rest of Italy and with Europe, and is easy to get to by air or land. Florence airport (4km far from the city center) and Pisa Airport (80km far from the city center) are both served by the main international companies as well as by some EU low cost companies. You can get to Florence flying from all the major EU capitals for less then 100 euros! Arriving by plane in Florence or Pisa airports, you can easily reach the city centre by bus, taxi or train.

Once in Florence, you can easily get to PIN by train from the SMN Florence train station to Porta al Serraglio train station in Prato.

PIN

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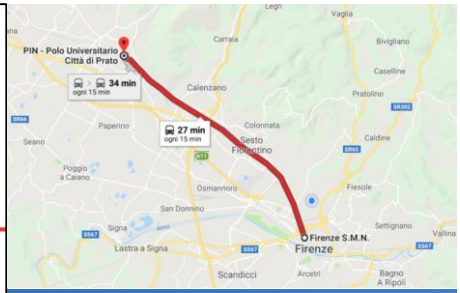


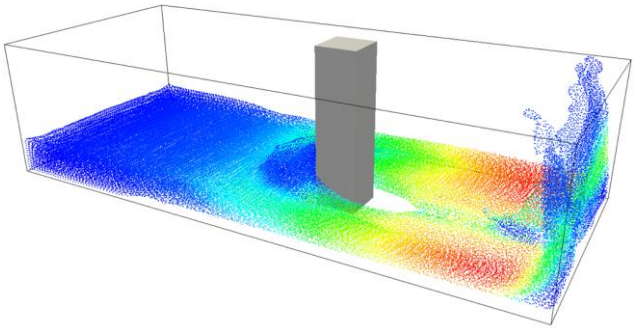
UNIVERSITÀ DEGLI STUDI FIRENZE | DICEA Dipartimento di Ingegneria Civile e Ambientale | LABIMA Laboratorio di Ingegneria Marittima

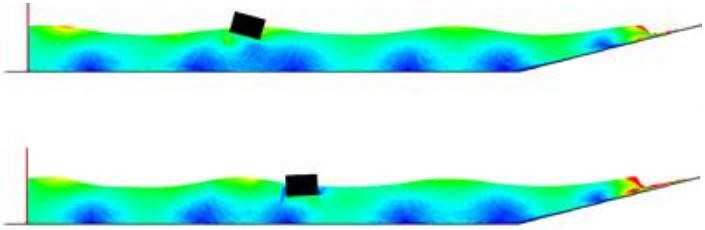
SHORT COURSE

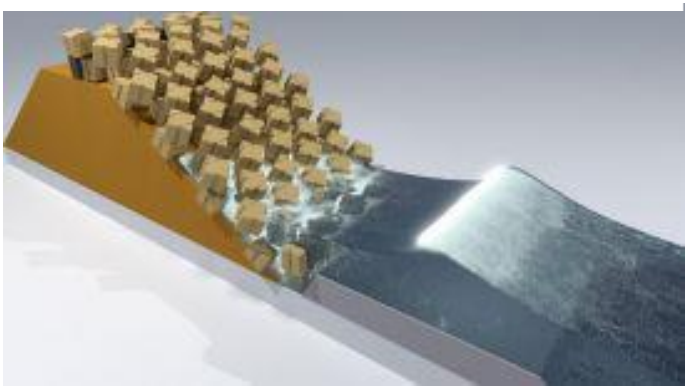
cpu gpu DualSPHysics

Computational Fluid Dynamics for Free Surface Flows by Smoothed Particle Hydrodynamics

27th September 2018







LABIMA – Laboratory of Maritime Engineering

www.labima.unifi.it

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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 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.
The DualSPHysics code has already been applied to coastal applications (including validation with experiments) such as: i) to simulate wave interaction with complex geometries such as rubble mound breakwaters, ii) to assess accurately the forces exerted by sea waves on coastal defences, iii) to simulate floating WEC devices under the action of extreme waves, including wave breaking and overtopping, in order to study their survivability and efficiency to absorb the available wave energy in extreme conditions

DualSPHysics code can be proposed as complementary tool to physical model experiments for a preliminary design of the coastal defences and WEC devices.

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, sloshing tanks, floating objects and wave tanks. This practical session includes pre-processing, execution and post-processing of the results (and validation with experimental data).

Date and venue

The course (8 hours duration) will be next 27th September 2018 at PIN the campus of the University of Florence in Prato

Registration

The participation is free of charge.
It is limited to 30 attenders.
The first come first served rule is applied.
Registration at www.labima.unifi.it
or use the QR code

Contact: Lorenzo Cappietti (lorenzo.cappietti@unifi.it).

Programme

08h30 Reception

09h00 Presentation of the course
Lorenzo Cappietti (LABIMA-UNIFI)
Moncho Gómez Gesteira (UVIGO)

09h15 "Introduction to SPH"
Moncho Gómez Gesteira (UVIGO)

10h00 "The DualSPHysics code"
José M. Domínguez (UVIGO)

10h45 Coffee break

11h30 "Applications in coastal engineering"
Alex Crespo (UVIGO),
Corrado Altomare (UGENT-FHR)

12h15 "Introduction to Practical Session"

13h00 Lunch

14h30 "Practical Session: Simulation and Postprocessing"

18h00 Close

This short course is also funded by the Ministry of Economy and Competitiveness of the Government of Spain under project "WELCOME ENE2016-75074-C2-1-R"