"ply2SPHERA_perimeter v.2.0": documentation file

1. Warranties and responsabilities

"ply2SPHERA_perimeter v.2.0" (RSE SpA) is a minor tool, which is released "as is" with no warranty. NEITHER RSE SPA, NOR ANY OF ITS REPRESENTATIVES (OR ANY AUTHOR) MAKE ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUMES ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, EFFECTIVENESS, INTEGRITY, AVAILABILITY, OR USEFULNESS OF THE SOFTWARE, ANY INFORMATION PERTAINING TO THE SOFTWARE, OR REPRESENTS THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED RIGHTS. No support service (for the software installation, use, …) is implied by or included in the software license. "

2. Citation of "ply2SPHERA_perimeter v.2.0"

All the published and unpublished items/products/documents of every kind, someway related to "ply2SPHERA_perimeter v.2.0", need the following citation: "ply2SPHERA_perimeter v.2.0 (RSE SpA)".
 "ply2SPHERA_perimeter v.2.0 (RSE SpA)" should also be cited in all the related publications, reports and dissemination tools and media, by means of the following citation:
"The minor tool "ply2SPHERA_perimeter v.2.0" is realised by RSE SpA thanks to the funding "Fondo di Ricerca per il Sistema Elettrico" within the frame of a Program Agreement between RSE SpA and the Italian Ministry of Economic Development (Ministero dello Sviluppo Economico)."

3. Acknowledgments

The minor tool "ply2SPHERA_perimeter v.2.0" has been financed by the Research Fund for the Italian Electrical System (for "Ricerca di Sistema -RdS-"), at different stages:
- ✓ under the Contract Agreement between RSE SpA and the Italian Ministry of Economic Development for the of RdS period 2012-2014, in compliance with the Decree of November 9, 2012.
- ✓ under the Contract Agreement between RSE SpA and the Italian Ministry of Economic Development for the RdS period 2015-2017, in compliance with the Decree of 21 April 2016. Reference project: 'A.5 - Sicurezza e vulnerabilità del sistema elettrico', Frigerio A. et al., 2015–2018.

4. Description and references

"ply2SPHERA_perimeter v.2.0" (RSE SpA) is a minor pre-processing tool of the SPH code SPHERA v.9.0.0 (RSE SpA). It deals with the format conversion from ".ply" to the format of the sections "VERTICES" and "FACES" of SPHERA main input file to describe the perimeter of a 3D zone (for 3D simulations) or a 2D zone (for 2D simulations). With Copyright 2016-2018 (RSE SpA), "ply2SPHERA_perimeter v.2.0" is written by Andrea Amicarelli (email address: andrea.amicarelli@rse-web.it).
"ply2SPHERA_perimeter v.2.0" is free software released under the GNU General Public License (Free Software Foundation).

5. Notes

The ".ply" input file is located in the working directory. Here, there is also the main input file of ply2SPHERA_perimeter v.2.0: ply2SPHERA_perimeter.inp. This is composed by 3 lines, with the following structure:
<integer_1> <integer_2> <integer_3> ! perimeter_first_vertex_ID (ID of the first vertex of the perimeter); perimeter_first_face_ID (ID of the first face of the perimeter); perimeter_ID (ID of the perimeter)
<real> ! z_offset (offset of the z-coordinate)
<character> ! ply_file_name (name of the .ply input file)

6. Tutorials

ply2SPHERA_perimeter v.2.0 is validated on 4 tutorials (following sub-sections), each one having possible variants. Some of the tutorials are published on International Journals and were also carried out with previous versions of the code. Other minor test cases only represent very simple configurations.

6.1. "db_Alpe_Gera"

This tutorial is completely described in Amicarelli & Agate (2017, [3]). This project report is Open-Access and also includes a synthetic English version.

6.2. "db_Alpe_Gera_Lanzada_substations"

This tutorial is completely described in Amicarelli (2018, [1]). This project report is Open-Access and also includes a synthetic English version.

6.3. "edb_ICOLD"

This tutorial is completely described in Amicarelli et al. (2017, [5]). The paper version available on ResearchGate might help in case the published version is unavailable.

6.4. "spherical_Couette_flows"

This tutorial is described in Amicarelli et al. (2016, SPHERIC, [3]). The tutorial is also available on Amicarelli & Agate (2016, RdS, [2]). This project report is Open-Access and also includes a synthetic English version.

7. References

1. Amicarelli A., 2018; Modellazione fluidodinamica SPH 3D per la propagazione di inondazioni in ambiente urbano e valutazioni di supporto ai fini della gestione del sistema elettrico in aree soggette a rischio idrogeologico; RSE SpA, Ricerca di Sistema, Deliverable 18001519.
2. Amicarelli A., G. Agate, 2016, Modellazione fluidodinamica SPH per fenomeni di liquefazione in dighe in terra e realizzazione di una versione "Free Open-Source Software" del codice SPH SPHERA per la propagazione di inondazioni con trasporto di corpi solidi e trasporto solido di fondo, RSE, Ricerca di Sistema, Rapporto 16001838
3. Amicarelli A., G. Agate; 2017; Modellazione fluidodinamica SPH per la propagazione di inondazioni in presenza di opere di protezione; RSE SpA, Ricerca di Sistema, Deliverable 17002102.
4. Amicarelli A.; G. Agate, B. Stefanova, S. Sibilla, J. Grabe; 2016; A SPH model for dike overtopping and dam liquefaction with bed-load transport, bottom drag and mobile boundaries; 11th SPHERIC ERCOFTAC International Workshop SPHERIC 2016 – ERCOFTACT Conference, pp.424-431, Garching (Munich, Germany); ISBN: 9783000533587.
5. Amicarelli A., B. Kocak, S. Sibilla, J. Grabe; 2017; A 3D Smoothed Particle Hydrodynamics model for erosional dam-break floods; International Journal of Computational Fluid Dynamics, 31(10):413-434; DOI 10.1080/10618562.2017.1422731