“ply2SPHERA_perimeter v.3.0”: documentation file

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“ply2SPHERA_perimeter v.3.0 (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.3.0” 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

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- 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;
- under the Contract Agreement between RSE S.p.A. and the Ministry of Economic Development - General Directorate for the Electricity Market, Renewable Energy and Energy Efficiency, Nuclear Energy in compliance with the Decree of April 16, 2018; Project: “2.5 Modelli e strumenti di intervento, anche preventivo, per la difesa e il miglioramento della sicurezza e della resilienza delle reti” - Ricerca di Sistema (2.5 Models and action tools for the safety and resilience of the power grids - Research on the Italian Energy System); Project Manager: Francesco Apadula (formerly Antonella Frigerio); Agreement between the Italian Ministry of Economic Development and RSE SpA 2019-2021;
- by the Research Fund for the Italian Electrical System under the Contract Agreement between RSE S.p.A. and the Ministry of Economic Development - General Directorate for the Electricity Market, Renewable Energy and Energy Efficiency, Nuclear Energy in compliance with the Decree of April 16th, 2018. Project Managers: Stefano Maran, Giovanni Pirovano.

4. Description and references

“ply2SPHERA_perimeter v.3.0” (RSE SpA) is a minor pre-processing tool of the SPH code SPHERA v.10.0.0 (RSE SpA, [2]). 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).

5. Tutorials

ply2SPHERA_perimeter is validated on 4 tutorials (following sub-sections), each one having possible variants. Some of the tutorials are published on International Journals. Other minor test cases only represent very simple configurations.

5.1.“db_Alpe_Gera”

This tutorial is described in Amicarelli et al. (2020, [4]). The paper version available on ResearchGate might help in case the published version is unavailable.

5.2.“db_Alpe_Gera_Lanzada_substations”

This tutorial is described in Amicarelli (2021, [3]). The paper version available on ResearchGate might help in case the published version is unavailable.

5.3. “edb_ICOLD”

This tutorial is described in Amicarelli et al. (2017, [1]). The paper version available on ResearchGate might help in case the published version is unavailable.

5.4.“spherical_Couette_flows”

This tutorial is described in Amicarelli et al. (2022, [5]). The paper version available on ResearchGate might help in case the published version is unavailable.

6. References

1. 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
2. SPHERA (RSE SpA), https://github.com
3. A. Amicarelli, S. Manenti and M. Paggi, “SPH modelling of dam-break floods, with damage assessment to electrical substations,” International Journal of Computational Fluid Dynamics, vol. 35, no. 1-2, pp. 3-21; DOI 10.1080/10618562.2020.1811240, 2021.
4. A. Amicarelli, S. Manenti, R. Albano, G. Agate, M. Paggi, L. Longoni, D. Mirauda, L. Ziane, G. Viccione, S. Todeschini, A. Sole, L. Baldini, D. Brambilla, M. Papini, M. Khellaf, B. Tagliafierro, L. Sarno and G. Pirovano, “SPHERA v.9.0.0: a Computational Fluid Dynamics research code, based on the Smoothed Particle Hydrodynamics mesh-less method,” Computer Physics Communications, vol. 250, pp. 107157, https://doi.org/10.1016/j.cpc.2020.107157, 2020.
5. A. Amicarelli, E. Abbate and A. Frigerio, “SPH modelling of a dike failure with detection of the landslide sliding surface and damage scenarios for an electricity pylon,” International Journal of Computational Fluid Dynamics, vol. 36, no. 4, pp. 265-293, DOI 10.1080/10618562.2022.2108020, 2022.