"Grid Interpolator v.3.0": documentation file

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"The minor tool "Grid Interpolator 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 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;
- ✓ 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

Grid Interpolator v.3.0 (RSE SpA) is written by Andrea Amicarelli.

"Grid Interpolator v.3.0" is free software released under the GNU General Public License (Free Software Foundation).

5. Tutorials

Grid Interpolator is validated on 4 tutorials (following sub-sections), each one having possible variants. Some of the tutorials are published on International Journals or they are associated with paper preprints. Other minor test cases only represent very simple configurations.

5.1. "db_Alpe_Gera"

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

5.2. "db_Alpe_Gera_Lanzada_substations"

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

5.3. "edb_ICOLD"

This tutorial is described in Amicarelli et al. (2017, [2]). The paper version available on ResearchGate might help in case the published version is unavailable.

5.4. "Vajont_dof_Ymax"

This tutorial is described in Amicarelli et al. (2022, [5]).

6. 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., 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
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. SPHERA (RSE SpA), https://github.com
5. A. Amicarelli and et al., "SPH modelling of the Vajont dam-overtopping flood with wall functions adapted to flash floods and weir-like inlet sections," p. preprint, 2022.