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PROCEEDINGS

A SPH Formulation for Coupled Thermal-Hydraulic-Mechanical Processes of Saturated Porous Media

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ABSTRACT

In this talk, we will present a SPH formulation for coupled Thermal-Hydraulic-Mechanical processes. The Biot's theory is used to model the fluid-solid interaction of saturated porous media, the Fourier's law and the Newton's law of cooling are used to describe the thermal conduction in a single medium and the heat exchange between the fluid and the solid, respectively. The physical model is expressed in the initial reference, and the total Lagrangian SPH is used to build the discrete formulation. We will discuss the numerical instability induced by twice repeated derivatives of discontinuous physical quantities, and then use a modified discretization scheme of second derivatives to remove this instability.

KEYWORDS

Coupled Thermal-Hydraulic-Mechanical processes; saturated porous media; second derivatives; SPH formulation

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.