Proceedings International
Platinum Open Access Journal (ISSN 2668-6384)

Proceedings, Abstract
Volume 3, Issue 2, 2021, 28
https://doi.org/10.33263/Proceedings32.028028

Three and Four Field Mixed Formulations in Poroelasticity †

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† Presented at Virtual International Conference on Physical Sciences (ICPS - 2021)
Received: 1.02.2021; Revised: 3.02.2021; Accepted: 4.02.2021; Published: 5.02.2021

Abstract: In this talk, we propose two different formulations for approximating the linear poroelasticity equation. The first formulation is a three-field formulation in which the steady-state version of the system is recast in terms of displacement, pressure, and volumetric stress. For this formulation, we will discuss and analyze both continuous and finite element formulations. The second formulation is based on four fields. In this formulation, the system's primary variables are the solid displacement, the fluid pressure, the fluid flux, and the total pressure. A discontinuous finite volume is designed to approximate solid displacement, whereas a mixed method is employed to approximate fluid flux and other two pressure.

Keywords: linear poroelasticity equation; three field formulation.

Funding

This research received no external funding.

Acknowledgments

This research has no acknowledgment.

Conflicts of Interest

The authors declare no conflict of interest.