A DOMAIN DECOMPOSITION PROCEDURE FOR THE SIMULATION OF WAVES IN FLUID SATURATED COMPOSITE POROVISCOELASTIC MEDIA

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This work presents an iterative domain decomposition finite element procedure to solve the equations describing wave propagation in a porous medium composed of two weakly coupled solids saturated by a single-phase fluid for the case of spatially variable porosity.

The plane wave analysis for this model shows the existence of three compressional and two shear modes of propagation.

The equations of motion are formulated in the space-frequency domain including dissipation in the solid matrix and frequency correction factors in the mass and viscous coupling coefficients. First order absorbing boundary conditions are employed at the artificial boundaries of the computational domain.

Examples showing the application of the algorithm to describe wave propagation in permafrost and shaley sandstones are presented.