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16. Applications

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Stress-Controlled and Velocity-Controlled Shear Waves in a Saturated Granular Medium

We study the interaction of plane shear waves, when either the stress or velocity is a given periodic function on the boundary. The soil is modelled as a continuum, obeying a hypoplastic flow rule. In both cases, wave interactions are confined to a strip of width x_I, along the boundary. As $t \to \infty$, $x > x_I$, the velocity and stress approach asymptotic, time-independent values. For the stress-controlled case, the saturated state depends smoothly on the boundary data. In the velocity-controlled case, however, the asymptotic state exhibits a wildly discontinuous, fractal behavior, as the boundary data is varied.