Explicit secular equations of Rayleigh waves in elastic media under the influence of gravity and initial stress

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Abstract: The problem of Rayleigh waves in an orthotropic elastic medium under the influence of gravity and initial stress was investigated by Abd-Alla [A. M. Abd-Alla, Propagation of Rayleigh waves in an elastic half-space of orthotropic material, Appl. Math. Comput. 99 (1999) 61-69], and the secular equation of the wave in the implicit form was derived. However, due to the uncorrect representation of the solution, the secular equation is not right. The main aim of the present paper is to reconsider this problem. We find the secular equation of the wave in explicit form. By considering some special cases, we obtain the exact explicit secular equations of Rayleigh waves under the effect of gravity of some previous studies, in which only implicit secular equations were derived.

Author Keywords: Gravity; Initial stress; Orthotropic; Rayleigh wave velocity; Rayleigh waves; Secular equation

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