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Pham Chi Vinh, Nguyen Quynh Xuan

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Rayleigh waves with impedance boundary condition: Formula for the velocity, Existence and Uniqueness

Pham Chi Vinh * and Nguyen Quynh Xuan
Faculty of Mathematics, Mechanics and Informatics
Hanoi University of Science
334, Nguyen Trai Str., Thanh Xuan, Hanoi,Vietnam

Abstract

The propagation of Rayleigh waves in an isotropic elastic half-space with impedance boundary conditions was investigated recently by Godoy et al. [Wave Motion 49 (2012), 585-594]. The authors have proved the existence and uniqueness of the wave. However, they were not successful in obtaining an analytical exact formula for the wave velocity. The main purpose of this paper is to find such a formula. By using the complex function method, an analytical exact formula for the velocity of Rayleigh waves has been derived. Furthermore, from the obtained formula, the existence and uniqueness of the wave has been established easily.

Key words: Rayleigh waves, Impedance boundary conditions, Method of complex function, Exact formula for the wave velocity.

1 Introduction

Elastic surface waves, discovered by Rayleigh (1885) more than 120 years ago for compressible isotropic elastic solids, have been studied extensively and exploited in a

*Corresponding author: Tel:+84-4-5532164; Fax:+84-4-8588817; E-mail address: pcvinh@vnu.edu.vn (P. C. Vinh)