# An improved approximation of Bergmann's form for the Rayleigh wave velocity

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Abstract: In the present paper an improved approximation for the Rayleigh wave velocity in isotropic elastic solids is obtained using the method of least squares. It is of Bergmann's form, i.e. the form of the ratio of two binomials. It is shown that this approximation is the best one of the Rayleigh wave velocity, in the sense of least squares, with respect to the class of functions whose elements are the ratio of two binomials. This approximation is much more accurate than Bergmann's one. Its maximum percentage error is 10 times smaller than that of Bergmann's. It is 7.6 times better than the one obtained recently by Royer and Clorennec [D. Royer, D. Clorennec, An improved approximation for the Rayleigh wave equation, Ultrasonics 46 (2007) 23-24]. An approximation of Bergmann's form for the squared Rayleigh wave velocity is also derived and its maximum percentage error is 5 times smaller than that of Royer and Clorennec's approximation. Some polynomial approximations with very high accuracy are also obtained. 

Author Keywords: Rayleigh wave velocity; The best approximation; The method of least squares

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