FUNDAMENTAL SOLUTIONS FOR WAVE EQUATIONS OF A THREE JOINED TRANSVERSELY ISOTROPIC FULL-SPACE

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A three joined dissimilar Green linear elastic transversely isotropic material is considered to have a full space. The dissimilar materials contain an upper half space $z<0$, a layer of thickness h, $0<z<h$ and a lower half space, $z>h$, where z is a Cartesian coordinate. These dissimilar materials are joined in such a way to have the same axis of symmetry, z. Using a series of displacement potential functions proposed in [1], the coupled wave equations are transformed to a second and a forth order partial differential equations. The solutions of these equations, in cylindrical coordinate system, due to an arbitrary load with frequency ω applied at $z=h$ are obtained using Fourier series in circumferential direction as well as Hankel integral transform in radial direction. The solutions are then investigated in detail in the special case of a point force. The degenerated results for a transversely isotropic half space and for an isotropic half space are shown to be identical with the existing solutions given respectively in [2] and [3]. The solutions of the wave equations for a triple joined spaces may be used as the fundamental solution for dynamic analysis of the structures using boundary element method and also to determine the impedance functions of a structure of arbitrary shape rested either on the surface of a half space or in the interior of it.

References

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Key words: Transversely isotropic material, Potential functions, Axissymetric surface wave.

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