SM9S_11568

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

A Quasi-Spherical Coordinate System and Its Application to the Determination of Vertex-Type Singularities

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To avoid the inherent singularity of the spherical coordinates at their poles, a new quasi-spherical coordinate system is developed. In this coordinate system, a finite element procedure is proposed to determining the eigen-solutions at three-dimensional vertices in which the field variables are proportional to the (lambda+1)-th power of the distance from the vertices. The resulting global equation is a second order characteristic matrix equation. Several demonstrating problems are investigated. It can be seen that the formulation yield satisfactory results.

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