GAURSAT FUNCTIONS FOR AN INFINITE PLATE WITH A GENERALIZED CURVILINEAR HOLE IN ZETA- PLANE

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Abstract

Here, we used a rational mapping function with complex constants to derive exact and close expressions of Gaursat functions for the first and second fundamental problems (plane elasticity problems) of an infinite plate weakened by a hole having arbitrary shape. Notable, the area outside the hole is conformally mapped outside a unit circle by means of the rational mapping.

The complex variable method has been applied in the procedure and it transforms the fundamental problems to the integro- differential equations that can be solved by using Cauchy type integrals. The hole takes different famous shapes which can be found throughout the nature like tunnels, caves, excavation in soil or rock, etc. Many previous works are considered as special cases of this work. Also many new cases can be derived from the problem.