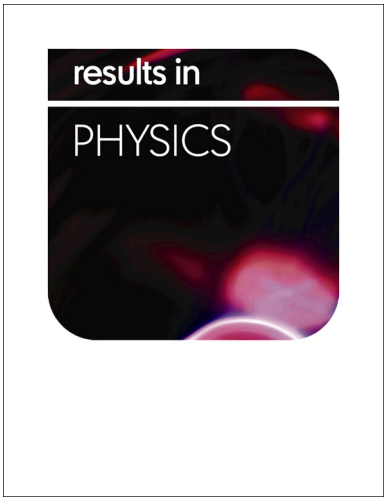

Physically elastic analysis of a cylindrical ring as a unit cell of a complete composite under applied stress in the complex plane using cubic polynomials

Vahid Monfared

PII: S2211-3797(17)31522-X
DOI: https://doi.org/10.1016/j.rinp.2017.11.036
Reference: RINP 1073

To appear in: *Results in Physics*

Received Date: 12 August 2017
Revised Date: 27 November 2017
Accepted Date: 30 November 2017

Please cite this article as: Monfared, V., Physically elastic analysis of a cylindrical ring as a unit cell of a complete composite under applied stress in the complex plane using cubic polynomials, *Results in Physics* (2017), doi: https://doi.org/10.1016/j.rinp.2017.11.036

Physically elastic analysis of a cylindrical ring as a unit cell of a complete composite under applied stress in the complex plane using cubic polynomials

Vahid Monfared: Young Researchers and Elite Club, Zanjan Branch, Islamic Azad University, Zanjan, Iran
E-mails: vahid_monfared_57@yahoo.com, vahid_monfared@alum.sharif.edu

Abstract

Elastic analysis is analytically presented to predict the behaviors of the stress and displacement components in the cylindrical ring as a unit cell of a complete composite under applied stress in the complex plane using cubic polynomials. This analysis is based on the complex computation of the stress functions in the complex plane and polar coordinates. Also, suitable boundary conditions are considered and assumed to analyze along with the equilibrium equations and bi-harmonic equation. This method has some important applications in many fields of engineering such as mechanical, civil and material engineering generally. One of the applications of this research work is in composite design and designing the cylindrical devices under various loadings. Finally, it is founded that the convergence and accuracy of the results are suitable and acceptable through comparing the results.

Keywords: Elastic analysis, Cylindrical ring, Complex plane, Composite, Unit cell

1. Introduction

In the engineering and scientific problems, complex variable method presents an influential approach for solution of many scientific problems in applied mechanics such as plasticity and elasticity problems theoretically. The approach may be used in the anisotropic, thermo-plastic, visco-plastic, plasticity and creep problems or other mathematical aspects like computation of