

## عنوان مقاله:

Elasticity Exact Solution for an FGM Cylindrical Shaft with Piezoelectric Layers Under the Saint-Venant Torsion by Using Prandtl's Formulation

## محل انتشار:

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## نویسندگان:

M. R Eslami - *Mechanical Engineering Department, Amirkabir University of Technology, Tehran, Iran*

M Jabbari - *Mechanical Engineering Department, Postgraduate School, Islamic Azad University, South Tehran Branch, Iran*

A Eskandarzadeh Sabet - *Mechanical Engineering Department, Postgraduate School, Islamic Azad University, South Tehran Branch, Iran*

## خلاصه مقاله:

Functionally graded materials (FGMs) belong to a noble family of composite material possess material properties varying gradually in a desired direction or orientation. In a past decade, functionally graded materials were remained in an interest of material investigators due to its prominent features, and have extensively used in almost every discipline of engineering which in turn significantly increases the number of research publication of FGM. In this paper the exact elasticity solution for an FGM circular shaft with piezo layers is analysed. piezoelectric layers are homogeneous and the modulus of elasticity for FGM varies continuously with the form of an exponential function. The shear modulus of the non-homogeneous FGM shaft is a given function of the Prandtl's stress function of considered circular shaft when its material is homogeneous. state equations are derived. The Prandtl's stress function and electric displacement potential function satisfy all conditions. The shearing stresses, torsional rigidity, torsional function for FGM layer and shearing stresses, electric displacements, torsional rigidity, electrical torsional rigidity, torsional and electrical potential functions for piezoelectric layers are obtained. Exact analytical solution for hollow circular cross-section presented. At the end some graphs and conclusions are given

## کلمات کلیدی:

FGM(functionally graded material), Piezoelectric, Elasticity, Torsion, Cylindrical shaft, Exact solution

## لینک ثابت مقاله در پایگاه سیویلیکا:

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