International J. of Math. Sci. & Engg. Appls. (IJMSEA)
ISSN 0973-9424, Vol. 7 No. I (January, 2013), pp. 371-381

INVERSE ESTIMATION OF TEMPERATURE DISTRIBUTION AND THERMAL STRESSES IN A SEMIINFINITE HOLLOW CIRCULAR CYLINDER BY QUASI-STATIC APPROACH

G. D. KEDAR[1] AND K. C. DESHMUKH[2]

[1] Department of mathematics,
Kamla Nehru Mahavidyalaya, Nagpur -09 (Maharashtra), India
[2] Department of mathematics,
RTM Nagpur University, Nagpur-33 (Maharashtra) India

Abstract

In this study inverse heat conduction problem is to simultaneously determine unknown temperature and thermal stresses on the outer curved surface of a semiinfinite hollow circular cylinder from the knowledge of temperature distribution within the cylinder. The hollow circular cylinder is subjected to an arbitrary known temperature under unsteady state condition. Initially the cylinder is at zero temperature and temperature at the lower surface is at zero heat flux. Also the inner boundary surface of the cylinder is at zero temperature. The governing heat conduction equation has been solved by using integral transform method. The results are obtained in series form in terms of Bessel's functions. Mathematical model has also been constructed with the help of numerical illustration.

Key Words : *Transient, Thermoelastic problem, Thermal Stresses, Inverse thermoelastic problem.*

© http: //www.ascent-journals.com