Electronic Transactions on Numerical Analysis.
Volume 38, pp. 303-316, 2011.

ISSN 1068-9613.

ETNA
Kent State University
http://etna.math.kent.edu

COMPUTATION OF THE TORSIONAL MODES IN AN AXISYMMETRIC ELASTIC LAYER*

MOHAMED KARA†, BOUBAKEUR MEROUANI†, AND LAHCÈNE CHORFI‡

Abstract. This paper is devoted to the numerical study of an eigenvalue problem modeling the torsional modes in an infinite and axisymmetric elastic layer. In the cylindrical coordinates (r, z), without θ, the problem is posed in a semi-infinite strip $\Omega = \mathbb{R}_+^* \times]0, L[$. For the numerical approximation, we formulate the problem in the bounded domain $\Omega_R =]0, R[\times]0, L[$. To this end, we use the localized finite element method, which links two representations of the solution: the analytic solution in the exterior domain $\Omega'_R =]R, +\infty[\times]0, L[$ and the numerical solution in the interior domain Ω_R.

Key words. Torsional modes, spectra, localized finite elements

AMS subject classifications. 35P15, 65N30, 47A70

*Received February 11, 2010. Accepted March 30, 2011. Published online on October 7, 2011. Recommended by R. Lehoucq.

†Department of Mathematics, Université Ferhat Abbas, Sétif, Algeria, (mkarab@yahoo.fr, mermathsb@hotmail.fr)

‡Department of Mathematics, Université Badji Mokhtar, Annaba, Algeria, (l_chorfi@hotmail.com)