

Asymptotic Analysis of Linearly Elastic Flexural Shells in Normal Compliance Contact

Ángel Arós, María Teresa Cao-Rial, Ariel Lombardi and Lucas David Venturato

We consider linearly elastic flexural shells in frictionless normal compliance contact with a deformable foundation. Starting from the three-dimensional elasticity problem, asymptotic analysis leads to a two-dimensional flexural shell contact model, for which convergence of the three-dimensional solutions is established. Since this limit problem is posed on the space of inextensional displacements, making its numerical approximation challenging, we introduce a Koiter-type contact model defined on a larger admissible space. We prove that this model converges to the flexural shell problem as the penalization parameter tends to zero, and present a penalized formulation together with numerical simulations illustrating the performance of the proposed approximation.

First Author: Ángel, Arós

Affiliation: *Dep. de Matemáticas, E.T.S. Náutica e Máquinas, Universidade da Coruña*
Centro de Investigación e Tecnoloxía Matemática de Galicia, CITMAga
15011, Spain

e-mail: angel.aros@udc.es

Second Author: María Teresa, Cao-Rial

Affiliation: *Dep. de Matemáticas, E.T.S. Náutica e Máquinas, Universidade da Coruña*
Centro de Investigación e Tecnoloxía Matemática de Galicia, CITMAga
15011, Spain

e-mail: teresa.cao@udc.es

Third Author: Ariel, Lombardi

Affiliation: *Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET*
Departamento de Matemáticas, FCEIA, Universidad Nacional de Rosario
S2000FZF, Argentina

e-mail: ariel@fceia.unr.edu.ar

Fourth Author: Lucas David, Venturato

Affiliation: *Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET*
Departamento de Matemática, FCE, Universidad Austral
S2000FZF, Argentina

e-mail: lventurato@austral.edu.ar