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ON AXIALLY SYMMETRIC SHELL PROBLEMS WITH REINFORCED JUNCTIONS

Violetta Konopińska-Zmysłowska * **and Victor A. Eremeyev**

Gdańsk University of Technology, Faculty of Civil and Environmental Engineering, ul. G. Narutowicza 11/12, 80-233 Gdańsk, Poland, violetta.konopinska@pg.edu.pl, victor.eremeyev@gmail.com, www.pg.edu.pl

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Real shell structures usually consist of more than one regular shell element, therefore it is so important to develop proper description of thin elements connection. The review of different theoretical, numerical and experimental approaches to modelling, analyses and design of the multi-fold shell structures with junctions is presented in [1]. Junctions between regular shell elements can be considered as rigid, simply-supported or deformable, they can also be treated as a reinforcement.

In order to model junctions with reinforcements here we use the non-linear exact shell theory developed by Libai and Simmonds [2], where the general, dynamically and kinematically exact six-field theory of regular shell was formulated with regard to a non-material surface as the shell base surface. In our work we consider multi-fold reinforced structures. Following [1, 3] we present the compatibility conditions for junctions with reinforcements which constitute the key-point of the problem. Other approaches are also known in the literature, see e.g. [4]. As an example we consider static axial deformation of an elastic cylindrical shell connected with circular plate reinforced by an elastic ring along junction. Restricting ourselves by small deformations we present the analytical solution of the problem. So it can be also used as a benchmark solution for more complex cases appeared in engineering.

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