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NEW TRENDS IN ZIGZAG THEORIES FOR MULTI-LAYERED AND SANDWICH BEAMS, PLATES, AND SHELLS

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ABSTRACT

Over the last three decades multi-layered composite and sandwich structures have been used extensively in the design of aeronautical, marine, and civil industrial applications. The material complexity of man-made composites provides the mechanics community with an abundance of challenging problems to study. To meet these challenges, a large number of theories for multi-layered composite and sandwich beams, plates, and shells have been advanced and applied to study static, dynamic, stability, and nonlinear problems, using both analytic and computational methods. Although much work is yet to be done in order to fully assess the merits of the various proposed theories, a general consensus based on historical reviews in the open literature show unequivocally that zigzag theories combine the attributes of simplicity, computational efficiency, and superior accuracy, thus making them most suitable for solving complex and large-scale problems.

Worldwide there are many research activities pursuing zigzag-type approximations for the analysis of composite and sandwich structures, with the number of efforts in this area steadily increasing. To provide a forum for discussion of new issues and challenges in the context of zigzag approximations and their computational implementations for multi-layered composite and sandwich structures, we propose a mini-symposium titled “*New trends in zigzag theories for multi-layered and sandwich beams, plate, and shells*.”

This mini-symposium will focus on recent advances in zigzag theories, with special emphasis on multi-scale approaches and their computational implementations (FEM, BEM, Meshless Methods, etc.); delamination and nonlinear effects, impact studies, functionally graded material layers, etc.

The mini-symposium will be structured as follows:

- Two or three sessions

- Within each session: two consecutive Keynote Lectures of 30 minutes each, plus three invited papers of 20 minutes each