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A DISCONTINUOUS GALERKIN FORMULATION FOR VARIABLE ANGLE TOW COMPOSITE PLATES HIGHER-ORDER THEORIES

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In this work, a discontinuous Galerkin (dG) formulation for the mechanical behaviour of variable angle tow (VAT) multi-layered composite plates [1] is presented. The starting point of the formulation is the strong form of the governing equations for VAT composite plates, which are obtained by means of the principle of virtual displacement (PVD) and the Equivalent Single Layer (ESL) assumption for the mechanical behaviour for the whole assembly [2].
To obtain the corresponding dG formulation, an auxiliary flux variable is introduced and the governing equations are rewritten as a first-order system of partial differential equations. Following Arnold et al. [3], suitably defined average and jump operators are introduced to link neighbouring mesh elements. Two different dG formulations are considered, namely the Interior Penalty and the Compact Discontinuous Galerkin formulations, which are obtained by specifying the numerical fluxes.
The developed formulation is numerically implemented using a hierarchical quad tree mesh and *hp*-convergence tests are presented to show the accuracy of the method.

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