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GENERALIZED FINITE DIFFERENCES ON STRUCTURED CONVEX GRIDS FOR IRREGULAR PLANAR DOMAINS

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Finite Difference Schemes (FDS) defined in logically rectangular grids have been widely used to get numerical approximations to the solution of partial differential equations in domains which are suitable to be decomposed in rectangular blocks. But when the region is not of this kind, the classical schemes cannot longer be applied.

Nowadays, due to recent advances on the direct variational grid generation method, the generation of structured convex grids in irregular plane regions defined by non-symmetric polygonal Jordan curves is a very efficient process. This fact allows the straightforward definition of generalized finite difference schemes for the solution of partial differential equations. This aim of this paper is to address the development and implementation of such schemes, as well as to pose the implications of the grid geometry on their consistency, stability and convergence properties.

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