INARIANT AND CONSERVATIVE PARAMETERIZATION SCHEMES

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Abstract. Differential equations describing physical processes usually possess an interesting geometric structure, which can include non-trivial symmetries and/or conservation laws. As this geometric structure is intimately linked to the processes described by the respective differential equations (e.g. the frame invariance in classical mechanics), the problem arises of how to preserve this structure in the course of atmospheric numerical modeling. In this talk we will introduce several methods for the construction of parameterization schemes that preserve symmetries and conservation laws of differential equations. These methods will be illustrated by constructing geometry-preserving subgrid-scale closure models for the incompressible Euler equations and the shallow-water equations.