Advances IN STUCTURE-PRESERVING METHODS anD APPLICATIONS

4000 Computational applied mathematics

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**Keywords:** structure-preserving, compatible discretization, discrete de Rham complex, mimetic methods.

ABSTRACT

The use of so-called *structure-preserving* methods for the numerical treatment of PDEs has undergone significant development in the recent years. These methods allow to preserve at the discrete level a number of key mathematical and physical properties of the continuous model in an exact way. This feature is made possible by the reproduction at the discrete level of certain algebraic objects at the continuous level such as de Rham complexes, Hamiltonian, etc. These results coming largely from differential (or symplectic) geometry are at the heart of many recent contributions, see for example [1] [2] [3] [4]. The cost of this theoretical abstraction is finally compensated by a gain in stability and accuracy, in particular by considerably reducing the space and time approximation errors in numerical simulations. The spectrum of application of these methods covers a wide range of classical and modern physics problems. The aim of this minisymposium is to present a sample of the latest advances on these methods and their applications in real-life problems.

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