Hamiltonian BVMs (HBVMs): a family of "drift free" methods for integrating polynomial Hamiltonian problems*

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Abstract

Energy drift is often observed in the numerical solution of Hamiltonian problems (see, e.g., [4]). Such drift can be related to the symmetry properties of the problem [2] but, essentially, it is due to the fact that the Hamiltonian function cannot be, in general, preserved for the discrete solution. Such a problem has been recently studied in [7, 5, 6], leading to the definition of a new class of methods, able to exactly preserve, for the discrete solution, polynomial Hamiltonians of arbitrary high degree. Such methods, which we name Hamiltonian BVMs (HBVMs), since their analysis has been initially carried out within the framework of block BVMs [3], have been recently analyzed within the framework of collocation methods [1]. The results of such analysis are presented in this talk.

References

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