

Recent Advances in Geometric Integration

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We provide a self-contained introduction to *discrete line integral methods*, a class of energy-conserving Runge-Kutta methods recently devised for the numerical solution of Hamiltonian problems [1]. The basic idea on which the methods rely on will be fully discussed, along with a corresponding novel framework for the analysis of the methods [2].

The class of energy-conserving Runge-Kutta methods named HBVMs (*Hamiltonian Boundary Value Methods*) will be studied in detail [3], including the efficient solution of the generated discrete problems.

The same basic approach, based on a discretized line integral, is then extended to derive more general classes of methods, able to cope with *general* conservative problems, possibly having multiple invariants [4].

Further generalizations will be also sketched, along with future directions of investigation.

References

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