On the global error of some approximants to near identity maps

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Abstract

Starting from a new formulation of envelope-following methods, by introducing a rational approximant to the solution of the recurrence relation satisfied by the flow of some dynamical systems having quasi-periodic solutions, an expression for the discretization error is derived. Since the formula, similar to the usual one for standard methods, rests on the elementary differential of the vector field, the asymptotics of the global error can be obtained applying an integral expression for the global error due to Iserles [1].

References

[1] A. Iserles. On the global error of discretization methods for highly-oscillatory ordinary differential equations. *BIT*, 42(3):561–599, 2002.