The asymptotic numerical solution of highly oscillatory second-order differential equations

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Abstract

The paper is concerned with what is sometimes called "intrinsic oscillation'', namely originating in the structure of the differential system itself, and as distinct to "extrinsic oscillation'', whereby the oscillation is "pumped" into the system through an inhomogeneous term. This is an important distinction, because the two forms of oscillation are very different. In this paper, we address the highly oscillatory second-order initial value problems of the first type by extending the methods of the second. the asymptotic-numerical solvers for highly oscillatory second-order problems are developed, the error bounds are analyzed, and the accuracy is presented by numerical experiments.

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