

Dynamical control of approximation methods

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In order to obtain with an approximation method a result for which the global error (consisting of both the truncation error and the round-off error) is minimal, a strategy, based on a converging sequence computation, has been proposed. Computation is carried out until the difference between two successive iterates has no exact significant digit. Then it is possible to determine which digits of the result obtained are in common with the exact solution. This strategy has been applied to the computation of multiple integrals using Discrete Stochastic Arithmetic, an automatic method for round-off error analysis based on a random rounding mode.