

Peano Kernels, Numerical Integration and Maple

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Abstract Peano kernels are most popular for their application in constructing integration rules and (perhaps) more importantly for providing an estimate of the error in the rule. The systematic use of these kernels has produced an abundance of new rules as well as providing many new error bounds for the well known Newton-Cotes rules.

In this paper we will outline a simple method that uses the computer algebra system Maple that is able to recapture the well known Ostrowski, trapezoidal and Simpson's inequalities. Moreover, the technique, which involves manipulation of the Peano kernel, can be adapted to develop new rules, which due to algebraic complexities, have yet to be fully discovered.

Applications involving statistical estimations, singular integration and integral equations are explored.
