Fourth order ARK methods with five stages

Nicolette Moir
nicolette@math.auckland.ac.nz
The University of Auckland, New Zealand

ARK methods (Almost Runge-Kutta methods) differ from traditional Runge-Kutta methods in that more information is passed from step to step. This extra information adds a multistep character to the the methods, while still allowing them to retain good stability. Because the stage order is higher than for Runge-Kutta methods, cheap error estimation and interpolation because possible. Fourth order ARK methods with four stages are now well understood and we will focus on fourth order methods with an additional fifth stage. A partial classification of the new methods will be presented with promising special cases highlighted. It is hoped that better performance than for known ARK is possible, not only in terms of greater efficiency, but also in terms of the availability of reliable error estimators and interpolators.