

# DXRK8, an Order 8 Explicit Runge-Kutta Code With General 1/0 Capabilities

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## Abstract:

DXRK8 is a code derived from the code DOP853 which appears in the second edition of Solving Ordinary Differential Equations I, by Hairer, Norsett and Wanner. This in turn is based on formulas derived by Dormand and Prince. DXRK8 is unique for Runge-Kutta codes in providing for very general output control, including both interpolatory and extrapolatory G-Stops. New methods for selecting the starting stepsize, for choosing the next stepsize, and for detecting stiffness are part of the code. Performance of the code is very similar to that for DOP853 if no interpolation is done, and otherwise is better. The code also compares favorably with the codes in RKSUITE by Brankin, *et. al.* These latter results suggest that low order Runge Kutta methods are not as effective as higher order ones, Finally comparisons with DIVA, a variable order Adams code by the author suggest that Runge-Kutta methods are not competitive with a good variable order Adams code, except when function evaluations are very cheap and/or accuracy requirements are crude,

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