Explicit Adams-type methods with extended stability interval

Barys Faleichyk @ (Belarusian State University), Vasily Repnikov, Andrew Moysa

R 1.23 Tue Z3 11:40-11:50

In the talk we present explicit Adams-type multistep methods with extended stability interval, which are analogous to the stabilized Chebyshev Runge–Kutta methods. It is proved that for any $k \geq 1$ there exists an explicit k-step Adams-type method of order one with stability interval of length $2k$. The first order methods have remarkably simple expressions for their coefficients and error constant. A damped modification of these methods is derived. In general case to construct a k-step method of order p it is necessary to solve a constrained optimization problem in which the objective function and p constraints are second degree polynomials in k variables. We calculate higher-order methods up to order six numerically and perform some numerical experiments to confirm the accuracy and stability properties of the methods.