Some illustrations of stability domains

Copied from: Fornberg, B. and Flyer, N., A Primer on Radial Basis functions with Applications to the Geosciences, SIAM, 2015.

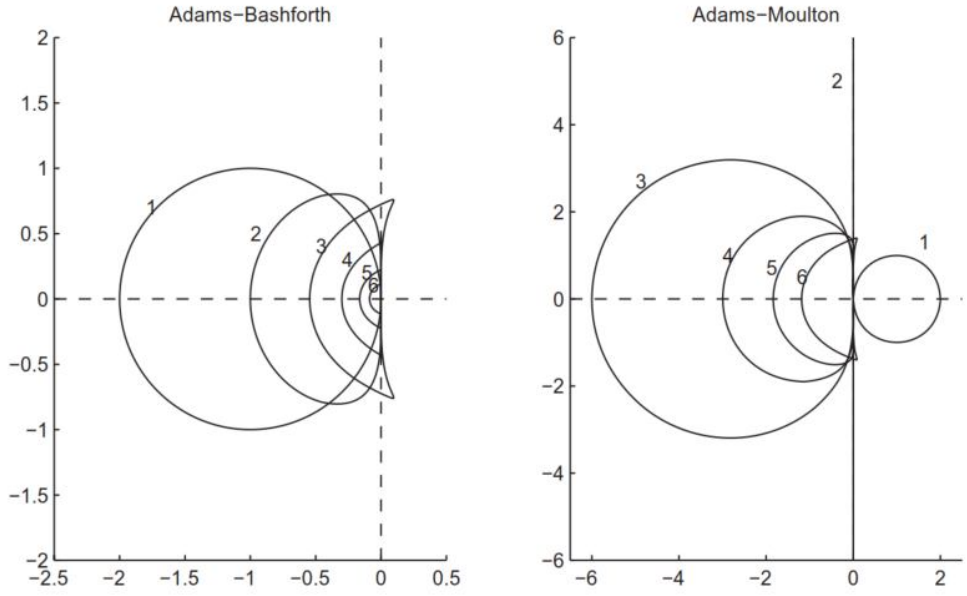

Figure 1.2. *Stability domains for (left) Adams-Bashforth (AB) and (right) Adams-Moulton (AM) methods of orders* $p = 1, 2, \ldots, 6$. *The stability domains in all cases include the regions immediately to the left of the origin; i.e., for AM1, it is the domain* $|1 - \xi| \geq 1$, *and, for AM2, the left half-plane. In all other cases, the regions are bounded. A section along the imaginary axis near the origin is included for AB methods of orders* $3, 4, 7, 8, 11, 12, \ldots$ *and for AM of orders* $1, 2, 5, 6, 9, 10, \ldots$. *Note that the scale differs by a factor of three between the two figures.*

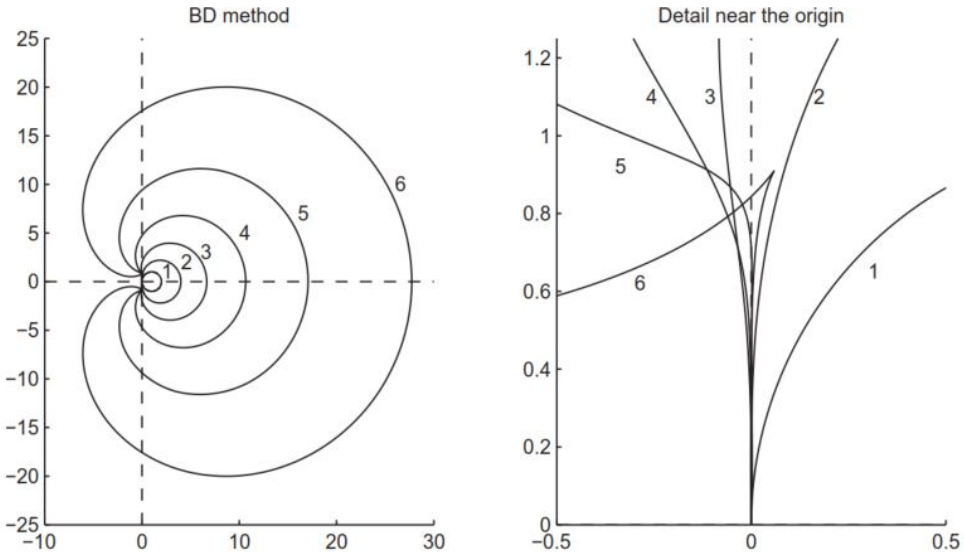

Figure 1.3. *Stability domains of backward differentiation (BD) methods of orders 1–6. The domains are in all cases outside of the shown boundary curves. (Left) The complete boundary curves. (Right) Detailed boundary structure near the origin.*

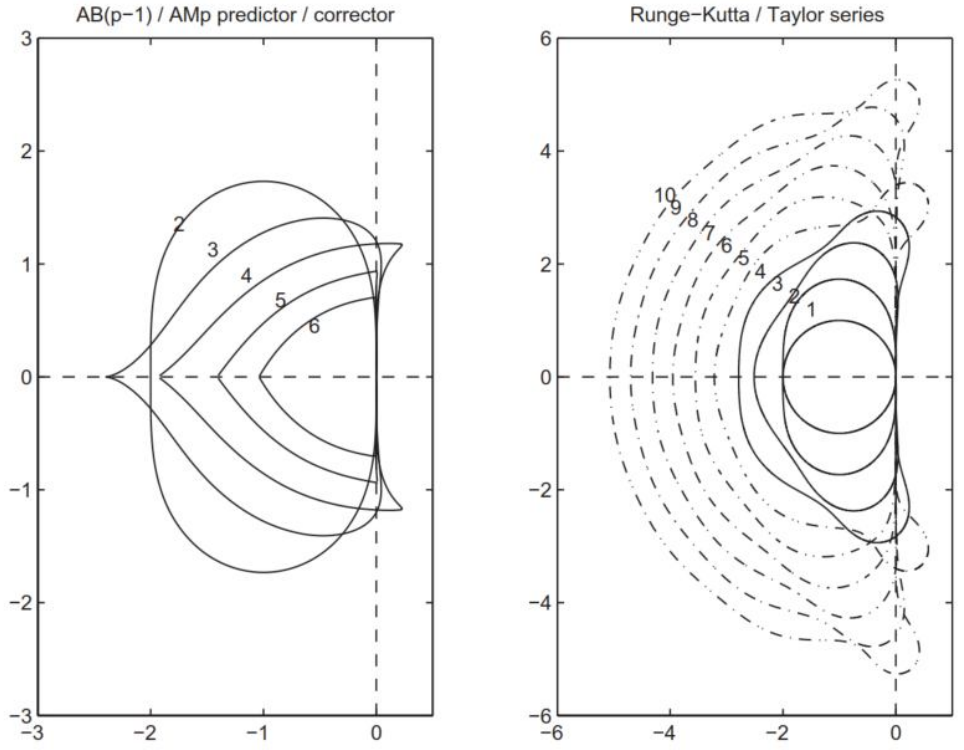

Figure 1.4. *Stability domains for (left)* AB(p−1)/AMp *predictor/corrector methods for* p = 2,3,...,6. *A section along the imaginary axis near the origin is included for* AB(p−1)/AMp *methods of orders* 3,4,7,8,11,12,... *and for* ABp/AMp *methods of orders* 1,2,5,6,9,10,... *[125]. (Right) Solid curves: Runge–Kutta* (RK) *methods or orders* (= number of stages) 1,2,3,4. *Solid and dash-dot curves: Taylor series methods of orders* $p = 1,2,\ldots,10$. *Note that the scales differ by a factor of two between the plots.*