UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

DIPARTIMENTO DI MATEMATICA

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Unità di Ricerca
Università degli Studi di Bari Aldo Moro

DIPARTIMENTO DI INFORMATICA

PhD Programme in Computer Science and Mathematics

SEMINAR ANNOUNCEMENT

Prof. Carmen Arévalo

Lund Institute of Technology, Sweden

Thursday – October, 24

Time: 3:10 p.m.
Room: Aula VI, Mathematics Department

Error estimation for adaptive multistep methods

In a k-step adaptive linear multistep method the coefficients depend on the k-1 most recent step size ratios. In a similar way, both the actual and the estimated local error will depend on these step size ratios. The classical error model has been the asymptotic model, $r = ch^{p+1}y^{(p+1)}(t)$, based on the constant step size analysis, where all past step sizes simultaneously go to zero. This does not reflect actual computations with multistep methods, where step size control selects the next step based on error information from previously accepted steps and the recent step size history. In variable step size implementations, therefore, the error model must be dynamic and include past step ratios, even in the asymptotic regime. In this talk we develop dynamic asymptotic models of the local error and its estimator. We show how a careful combination of method, error estimator, and controller keeps the asymptotic local error near a prescribed tolerance and enhances stability, producing more regular step size sequences.

Carmen Arévalo was professor of Numerical Analysis at Simon Bolivar University in Caracas, Venezuela, until 2003, and then at the Lund Institute of Technology (LTH), Numerical Analysis group, until her retirement in 2018. She is visiting professor of the Department of Mathematics from October 6 to December 6. Her research activity is related to the numerical solution of ordinary differential equations (ODEs) by multistep methods. In particular, she has worked on the construction of multistep methods for ODEs and for differential-algebraic equations (DAEs) with special attention to adaptivity issues.