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*Computation of characteristic values for partial  
retarded functional differential equations*

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**Abstract**

Partial differential equations of evolution involving time delay, also called Partial Retarded Functional Differential Equations (PRFDEs), arise in many fields: population ecology, control theory, genetic repression, climate models, structured population models.

In this talk we deal with semi-linear PRFDEs restated as abstract semi-linear RFDEs and, in particular, with the stability analysis of equilibrium points. It is well known that the asymptotic stability of an equilibrium point can be reduced to the asymptotic stability of the zero solution of the linearized equation, which in turn depends on the so-called characteristic values. The linearization of a semi-linear PRFDE about an equilibrium point yields an abstract fully-linear RFDE.

Recently, several numerical approaches have been proposed to approximate the characteristic values of non-abstract linear RFDEs. One of these approaches consists in the discretization by a pseudospectral technique of the infinitesimal generator of the semigroup of the solution operators of the RFDE. A natural but non-trivial extension to abstract linear RFDEs is presented together with convergence results and numerical evidence.

*It is a joint work with D. Breda.*