

: interactive software for computation of 1-dimensional PDE's

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Abstract

In this talk, we discuss recent extensions to `CONTENT`, an interactive software package developed at CWI (Amsterdam) by Yu. A. Kuznetsov and V. V. Levitin, to compute orbits and numerically pathfollow stationary solutions of systems of evolutionary PDE's on the unit interval with separated boundary conditions that can be written in the following form

$$\begin{cases} u_t(x, t) = F(u_{xx}(x, t), u_x(x, t), u(x, t), x, \alpha), & x \in (0, 1) \\ f^0(u_x(0, t), u(0, t), \alpha) = 0 \\ f^1(u_x(1, t), u(1, t), \alpha) = 0 \end{cases}$$

where $u(x, t) \in \mathbb{R}^n$ is a vector of component distributions at (x, t) , $\alpha \in \mathbb{R}^m$ is a vector of numerical parameters, F is a vector-function specifying the evolution of the distributions and $f^{0,1}$ are the boundary conditions at the left and right end point, respectively.

We illustrate the use of this software with several model computations, as the Bratu equation, the Brusselator and the tubular reactor.

*Fund for Scientific Research (F.W.O. Belgium)

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