

SOFTWARE ISSUES IN SOLVING INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS

DANA PETCU

ABSTRACT. A vast collection of mathematical software, representing a significant source of mathematical expertise, is available now for use by scientists and engineers in their efforts for modelling the evolution of real systems. Unfortunately, the heterogeneity of this collection makes difficult the task to determine what software is available to solve a given problem.

We discuss the state-of-the art in the field of software for ordinary differential equations (ODEs) and several issues which are of importance both from the point of view of software design and software or method evaluation. The survey is based on the analysis of current software: computer algebra systems including ODE solving facilities, dedicated problem solving environments, and specialized free or commercial packages. A special attention is paid to stiff and large ODE systems and parallel solvers. The requirements of an expert system for solving initial value problems (IVPs) for ODEs are also discussed.

INSTITUTE E-AUSTRIA IN TIMIȘOARA
AND
WESTERN UNIVERSITY OF TIMIȘOARA
COMPUTER SCIENCE DEPARTMENT
B-DUL VASILE PÂRVAN 4, 300223 TIMIȘOARA, ROMANIA
E-mail address: `petcu@info.uvt.ro`