

BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

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Virtual Seminar

MERLIN FALLAHPOUR

University of Basel

Implementation of a pathfollowing strategy with an automatic step-length control in the new MATLAB package bvpsuite2.0

ABSTRACT

In a first part, I will introduce to you the MATLAB package `bvpsuite2.0`. It is a boundary value problem solver in ordinary differential equations (ODEs) based on the collocation method. Afterwards, I will explain briefly some of the features of the package. Part of the features are the error estimation and mesh adaptation procedures as well as the handling of different types of problems, such as problems posed on a semi-infinite interval or eigenvalue problems in ODEs. Then, I will show numerical results computed with the code. In a second part, I will discuss the development of a pathfollowing module by a tangent continuation method. We adapted this method to the already existing code base and vice versa. Finally, I will present some numerical results computed by this new pathfollowing module.

This work was carried out at the Vienna University of Technology under the supervision of Prof. E. Weinmüller, in collaboration with Prof. W. Auzinger and Dr. O. Koch.