Solving BVPs for ODEs in MATLAB

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Problem Solving Environments (PSEs) are increasingly important tools for numerical computing. Working in a PSE differs significantly from general scientific computing (GSC). The codes are generally expected to provide simple and intuitive user interfaces and be robust and efficient in the context of the environment. In this talk we describe how these issues affected the MATLAB BVP solver, `bvp4c`. In particular, we explain how the code takes advantage of features of the PSE that are not widely available in GSC. We also point out some potential difficulties in porting to MATLAB codes written for GSC. The discussion will be illustrated with examples of BVPs solved in MATLAB.