

Lehigh University
Iacocca Hall, Room D307
111 Research Drive
Bethlehem, PA 18015 USA

Here are some key points about the routines on the two diskettes (if the routines were sent by mail) or in the Web page [http://www.lehigh.edu/~ wes1/odepde](http://www.lehigh.edu/~wes1/odepde):

- Each application is self contained and will run directly from only its subdirectory without accessing files from other subdirectories (this required the duplication of basic library routines in the various subdirectories).
- The top subdirectories for the six languages are:

```
\c  
\c++  
\fortran  
\java  
\maple  
\matlab
```

- Within each of these subdirectories, the applications are

```
\ode1x1 (discussed in Chapters 1 and 2)  
\ode2x2 (discussed in Chapter 3)  
\pdelin (discussed in Chapter 4)  
\pdenon (discussed in Chapter 5)
```

- Also, in

```
\matlab
```

additional subdirectories are included:

```
\intro      (introductory Matlab programs in Chapter 1)  
\appendixb  
\appendixc  (Matlab programs in Appendices B, C, E, F)  
\appendixe  
\appendixf
```

- The top subdirectory

```
\figures
```

contains the Powerpoint files for the figures in the book, and two small Matlab files by L. N. Trefethen (*Spectral Methods in MATLAB*, SIAM, Philadelphia, PA, 2000, Program 25, page 105) for drawing the stability contours of explicit RK methods and BDF methods of various orders.

- The top subdirectory

`\additions`

contains corrections to the book and additions of new routines as described in the file `\additions\additions.pdf`. In particular, the following have been added since publication of the book:

- The 2×2 ODE test problem discussed in Chapters 1 and 3 of the book has been extended in `\additions\ode2x2` to execute four new integrators, `ode23a.m`, `ode23b.m`, `ode45a.m`, `ode45b.m`, as well as the six integrators discussed in the book (`euler2a.m` to `rkf45b.m`). Concerning the new integrators:
 - * `ode23a.m` and `ode23b.m`, which call `ssode23.m`, are implementations of the RK (2,3) pair used in the Matlab integrator `ode23`.
 - * `ode45a.m` and `ode45b.m`, which call `ssode45.m`, are implementations of the RK (4,5) pair used in the Matlab integrator `ode45`.

File `\additions\ode2x2\ode2x2.m` executes all 10 (six in the book plus four new) ODE integrators (just enter `ode2x2` at the Matlab prompt).

- A 3×3 ODE test problem in file `\additions\ode3x3\ode3x3.m` executes the 10 integrators. The 3×3 problem and a derivation of the analytical solution that is compared to the numerical solutions from all of the integrators is in file `\additions\ode3x3\ode3x3.pdf`.
- A library of PDE spatial differentiation routines is in `\additions\pdelib`. This library is used in the solution of the linear PDE discussed in Chapter 4 and Appendix E of the book. The PDE application can be executed via file `\additions\pdelib\pdelin.m`.
- We have tried to write transportable code that has been thoroughly tested; but, of course, testing was done on a specific computer (a Unix system at Lehigh) using specific compilers (C, C++, Fortran and Java) and software releases (for Maple and Matlab). We think the routines will run as received under most other compilers and software releases, but we cannot guarantee this. Hopefully, at most only minor changes will be required to achieve correct execution of the programs.
- The .exe files, which are small batch Unix (ASCII) files, provide the line commands that were used for the testing. They also indicate the combinations of files that were compiled or interpreted and executed.
- The Java applications have been revised slightly so the subdirectory **mol** discussed in the book is no longer required. Rather, the four Java applications are now completely

self-contained in single subdirectories. The revised Java applications are in the top subdirectory

`\java_new`

Again, the four applications were executed on our central Unix system using the files with extension `.exe`.

- The output reported in the book should be reproducible. In most cases, output files are also included in the application subdirectories (ASCII files with the extension `.out`).

We would like to know about any missing files, or problems in using the files (please direct these to wes1@lehigh.edu). We hope you find the routines easy to use, interesting and useful.

Sincerely,

H. J. Lee
W. E. Schiesser

Lehigh University
Iacocca Hall, D307
111 Research Drive
Bethlehem, PA 18015
United States of America

Office: (610) 758-4264
Fax: (610) 758-5057
Internet: wes1@lehigh.edu
<http://www.lehigh.edu/~wes1/wes1.html>