

Essential Partial Differential Equations

MATLAB functions

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The following functions can be accessed by running `setpath` in the top-level directory:

Example	main file	subsidiary files	Figures	Table
4.4	<code>char_soln.m</code>		4.3	
6.2	<code>bvpex.m</code>		6.3, 6.4	6.2
6.14	<code>bvpex_ad.m</code>		6.5	
6.16	<code>bvpex_robin.m</code>		6.7, 6.8	
6.21	<code>bvpex_numerov.m</code>			6.3
10.1	<code>square_driver.m</code>	<code>poisson.m</code>	10.3, 10.4	10.1
10.5	<code>richardson.m</code>	<code>poisson.m</code>		10.2
10.6	<code>poisson_post.m</code>	<code>poisson_est.m</code>		10.3
10.7	<code>circle_driver</code>	<code>circle_cartesian.m</code>	10.10	10.4
10.12	<code>circle_driver</code>	<code>circle_polar.m</code>	10.12	10.5
10.16	<code>advdiff_driver.m</code>	<code>advdiff_exact.m</code>	10.17	
		<code>adv_diff.m</code>		
10.17 ¹	<code>advdiff_error.m</code>	<code>adv_diff.m</code>	10.18	
11.1	<code>ftcs.m</code>			11.1
11.1	<code>ftcs_fig.m</code>		11.3	
11.10	<code>btcs.m</code>			11.2
11.15	<code>crank_nicolson.m</code>			11.3
11.19	<code>crank_nicolson_fig.m</code>		11.7	
11.27	<code>mol_fig.m</code>	<code>heat1d.m</code>	11.9	
12.7–12.11	<code>hyperbolic_figs.m</code>	<code>hyp1d.m</code> , <code>hyp_ic.m</code>	12.5, 12.7, 12.8 12.10, 12.12	
12.17	<code>hyp_bc_fig.m</code>		12.16	
12.19	<code>hyp_limiter_fig.m</code>	<code>hyp_ic.m</code> , <code>unplot.m</code>	12.18	

Most of the remaining figures were produced using the package `pstricks` in L^AT_EX.

¹This function generates a sequence of grids ending with $M = 2^{11}$ grid points so it could take a nontrivial time to run to completion.

The following functions (from the `common_files` directory) proved to be particularly useful when generating the figures in the printed book:

`cyclefigs`: cycles through the figure windows.

`figs`: finds the numbers of open figure windows.

`mvxlabel`: used to adjust the position of the `xlabel` in specific figures.

`printfig`: the command `printfig(file,n)` causes figure number `n` to be printed to the file named `file-n`, where `file` is a string (usually the name of the file containing the command which makes it easier to locate the source code for a figure).

The command `printfig(file,n,cond)` will only save the figure if the condition `cond` is true (that is, has a nonzero value). For example

```
printfig('adv_diff',3,M==16)
```

will save figure 3 to a file named `adv_diff-3` only when `M=16`. The command will also accommodate a range of figures, for example `n = [1:3 6]`.

`setdefaults`: sets the font size for graphics and ensures that `LATEX` is used to interpret text strings and labels on figures.

`unplot`: removes the most recently plotted object from the current figure.