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INTRODUCING FOUR BENCHMARK SOLUTIONS

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Four problems for testing outflow/open boundary conditions (OBCs) for incompressible flow, described in the following Announcement, were selected from a total of about one dozen candidates considered by a small group of interested people in conjunction with the first Minisymposium on OBCs held at the University of Swansea, Wales, U.K., on 10 July 1989. Four volunteers—to obtain benchmark solutions—were also obtained from this group, and their 'early' results were presented in summary form at that same meeting. (There were no published proceedings from this minisymposium.) It was decided there to repeat and enlarge the OBC minisymposium and to coax/coerce each of the four 'volunteers' to present their benchmark solutions in the pages of this journal; hence, the following Announcement and four articles.

The benchmark solutions, and contributed solutions on the specified domains, will be discussed at the OBC Minisymposium to be held at Stanford University on Sunday 14 July 1991 (see the following Announcement).

The benchmark authors were requested to simply *summarize* their numerical methods and refer to the literature for more detailed descriptions, so that they could concentrate mainly on presenting the proposed benchmark solution as well as providing certain relevant data at the two shorter domain lengths. They were also asked to demonstrate—in any acceptable way—that magical-but-elusive quantity called a 'grid-converged solution'. Failing that, they were required to at least present an estimate of the accuracy of their benchmark solutions. Note that the domain lengths chosen by the benchmark authors were their own and that they do not claim a benchmark solution on that domain, owing to their own imperfect OBCs, but rather on the largest domain described in the test problem definition.

An opinion believed shared by all benchmark volunteers, whether expressed or implied, is that it is more difficult and time consuming to generate great confidence in experimental results from the CFD laboratory than one might believe initially.

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