ANNALS OF NUCLEAR ENERGY

Guidelines for Publication of Manuscripts that Deal with Computer Codes and Simulations

The editors of Annals of Nuclear Energy recognize the important role computer codes play in nuclear science and technology. Computer programs developed for the simulation of various aspects of power and process systems have become indispensable for the research and development, design and operation of such systems. This is particularly true for complex nuclear power systems. While large computer codes are now indispensable tools in research, uncritical reliance on code simulations can be misleading.

Computer codes dealing with nuclear systems and the types of simulations they provide cover a variety of methods and subjects. The journal's peer review process will therefore address submitted manuscripts on a case-by-case basis, and the decision regarding the suitability or otherwise of a manuscript for archival publication will be at the discretion of the editors, associate editors and reviewers of the journal. Nevertheless, it is recommended that the authors follow the forthcoming general guidelines for the preparation of their manuscripts.

1. Papers that report on the development, verification and validation of new computer codes

   * These papers would discuss the newly developed computer codes at or following the completion of such codes.
   * The computer codes should either be novel in their methodology or scope, or present a clear advantage in comparison with similar existing codes.
   * The computer codes should address processes, components, or systems that are of interest to the readers of the journal.

   The authors of these papers should include the following information in their manuscripts, either explicitly or by reference to other publicly accessible published papers.

   * A clear and complete description of their models, including the governing equations, boundary conditions, and all constitutive and closure relations
   * A clear and complete description of their solution methods
   * Validation against credible experimental data, analytical models, highly accurate published numerical solutions, or published benchmark numerical solutions
   * Sensitivity calculations showing the effects of grid refinement and coarsening and time step size (when applicable)

2. Papers that report on the application of widely-applied computer codes

   By widely-applied codes we mean codes that have been in use for a considerable time, have been extensively verified and validated, and are generally recognized as good predictors of the processes and systems they are meant to simulate. Good examples of such codes are RELAP5 and MCNP. These papers may:
   * report on novel and significant application, verification or validation of widely-applied computer codes;

- demonstrate the applicability of a widely-applied computer code or code suite to important and novel processes or systems;
- demonstrate significant shortcomings and weaknesses in these codes and code suites;
- demonstrate, in a systematic manner, the possibility of carrying out a certain type of complex analysis with a given widely-applied code or suite of codes, thus qualifying for the first time the performance of the code or code suite in the corresponding context;
- use widely-applied computer codes or code suites for studying novel and advanced design concepts, and successfully bring out novel and significant insight, thereby providing direction for future research;
- utilize widely-applied codes or code suites for the analysis and interpretation of new experimental data, thereby providing novel information about the capabilities or limitations of such codes; or
- utilize widely-applied codes or code suites for the analysis and interpretation of previously-published experimental data, thereby providing novel interpretations of such data.

The authors of these papers should include the following information in their manuscripts, either explicitly or by reference to other publicly accessible published papers.

- Description of their problems and code simulations (nodalization, boundary and initial conditions, values of all adjustable physical and numerical constants, etc.) in sufficient clarity and detail, so that their simulations can be reproduced by informed readers
- Adequate sensitivity analyses (grid-size effect, numerical convergence, etc.) in support of their simulations

3. Papers that report on the application of standard computational fluid dynamics (CFD) codes

   These papers should include the following information.

   - A clear and precise description of their problem and simulation set-up, so that their simulations can be reproduced by informed readers
   - Sufficient grid resolution analysis to demonstrate grid-independence or grid convergence, and a similar analysis with respect to time step size in time dependent simulations
   - Reference to relevant and accessible publications that would provide the readers with detailed information about the CFD code(s) they have applied