



Thermal-Hydraulics of Water Cooled Nuclear Reactors

Edited by Francesco D'Auria



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AUDIENCE

Researchers in academia at postgraduate level onwards working on nuclear reactor thermal hydraulics. Graduate students and final year undergraduates taking courses in nuclear thermal hydraulics. Scientists and technologists in the nuclear industry using thermal hydraulics for reactor design and safety technology development

SHELVING CLASSIFICATIONS

TECHNOLOGY & ENGINEERING / Power Resources / Nuclear

BISAC CODES

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Thermal-Hydraulics of Water Cooled Nuclear Reactors

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Detailed guide to the application of system thermal hydraulics (SYS TH) and the safety and acceptability of water-cooled nuclear power plants

KEY FEATURES

- Contains a systematic and comprehensive review of current approaches to the thermal-hydraulic analysis of water-cooled and moderated nuclear reactors
- Clearly presents the relationship between system level (top-down analysis) and component level phenomenology (bottom-up analysis)
- Provides a strong focus on nuclear system thermal hydraulic (SYS TH) codes
- Presents detailed coverage of the applications of thermal-hydraulics to demonstrate the safety and acceptability of nuclear power plants

DESCRIPTION

Thermal Hydraulics of Water-Cooled Nuclear Reactors reviews flow and heat transfer phenomena in nuclear systems and examines the critical contribution of this analysis to nuclear technology development. With a strong focus on system thermal hydraulics (SYS TH), the book provides a detailed, yet approachable, presentation of current approaches to reactor thermal hydraulic analysis, also considering the importance of this discipline for the design and operation of safe and efficient water-cooled and moderated reactors.

Part One presents the background to nuclear thermal hydraulics, starting with a historical perspective, defining key terms, and considering thermal hydraulics requirements in nuclear technology. Part Two addresses the principles of thermodynamics and relevant target phenomena in nuclear systems. Next, the book focuses on nuclear thermal hydraulics modeling, covering the key areas of heat transfer and pressure drops, then moving on to an introduction to SYS TH and computational fluid dynamics codes.

The final part of the book reviews the application of thermal hydraulics in nuclear technology, with chapters on V&V and uncertainty in SYS TH codes, the BEPU approach, and applications to new reactor design, plant lifetime extension, and accident analysis.

This book is a valuable resource for academics, graduate students, and professionals studying the thermal hydraulic analysis of nuclear power plants and using SYS TH to demonstrate their safety and acceptability.

RELATED TITLES

- Sehgal, *Nuclear Safety in Light Water Reactors: Severe Accident Phenomenology*, Academic Press, 2011, 9780123884466, \$190.00
- Petrangeli, *Nuclear Safety*, 2006, Butterworth-Heinemann, 9780750667234, \$141.00
- Alonso, *Infrastructure and Justification for Nuclear Power Programmes*, Woodhead, 2012, 1024pp, 9781845699734, \$420.00

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ABOUT THE AUTHORS

- All of the authors are internationally recognized experts within Nuclear Power Plant technology.
- The authors belong to following institution types:
 - Designer/vendor for nuclear reactors
 - Regulators and/or support to Regulators
 - National Labs
 - University
- An international team of authors based in the EU (7), Russia (1), Asia Far East (2), and the US (3).
- The authors hold specific expertise in the following areas:
 - Editor of renewed Journals (including one founder)
 - Member of Editorial Board of Journals
 - General Chair of International Conferences
 - Authors of Textbooks
 - Member of Academy of Science
 - Responsible of international projects in the experimental or the theoretical areas.
 - Chair of international groups inside OECD and IAEA
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