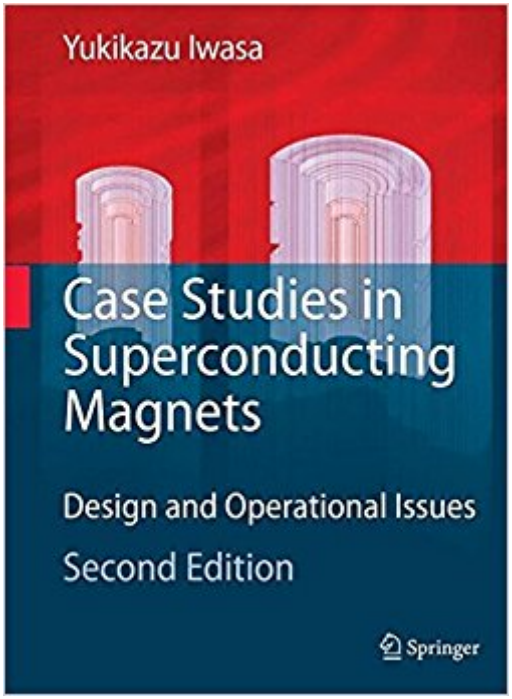
Case Studies In Superconducting Magnets: Design And Operational Issues



Synopsis

The 2nd edition emphasizes two areas not emphasized in the 1st edition: 1) high-temperature superconductor (HTS) magnets; 2) NMR (nuclear magnetic resonance) and MRI (magnetic resonance imaging) magnets. Despite nearly 40 years of R and D on superconducting magnet technology, most areas, notably fusion and electric power applications, are still in the R and D stage. One exception is in the area of NMR and MRI. NMR magnets are very popular among chemists, biologists, genome scientists, and most of all, by drug manufacturers for drug discovery and development. MRI and NMR magnets have become the most successful application of superconducting magnet technology and this trend should continue. The 2nd edition will have new materials never treated formally in any other book of this kind. As with the 1st, most subjects will be presented through problem format to educate and train the designer.

Book Information

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Customer Reviews

Review of first edition`A rich introduction to the essentials of superconducting magnet engineering. This graduate-level text has been designed around 86 practical problems that constitute the bulk of the book...The case studies contain a wealth of practical information...Highly recommended book for graduate-level engineering students.' Physics Today

Case Studies in Superconducting Magnets, Second Edition, is intended for graduate students as well as professional engineers, and covers the basic design and operational issues of

superconducting magnet technology. Based principally on magnet projects, chiefly of high-field DC solenoidal magnets, at the Francis Bitter Magnet Laboratory at the Massachusetts Institute of Technology, this book covers important and relevant topics on magnet design and operation issues: field distribution, magnets, force, thermal stability, dissipation, and protection. Features of the new edition include: New magnet design and operation issues primarily of high-temperature superconducting (HTS) magnets; Expanded coverage of field analysis, force analysis, cryogenics, AC losses, protection; Updated chapters throughout to reflect recent advances and new developments in the field; New homework problems and discussions; Fully updated references. Case Studies in Superconducting Magnets, Second Edition, serves as an important reference for magnet designers, experienced specialists as well as those just starting as professionals and as students, in the fields of mechanical, electrical, and cryogenic engineering.

A rigorous yet readable magnum opus; a comprehensive compilation of magnet-design facts, insights, methods and case studies; a tome of 682 pages, 210 figures, 87 tables and 885 references, meticulously edited and proofread to minimize the typos that can detract from the utility of a textbook or handbook. Chapters include Electromagnetic Field Theory, Fields & Forces, Cryogenics, Magnetization, Stability, AC Losses and Protection. Among the topics likely to be of especial interest and value to many readers are magnetic shielding, induction heating, magnetic forces, stresses and strains in a bonded solenoid, field expansion in Cartesian coordinates, and field-error coefficients. Of great value to almost everyone are the Appendix figures and tables of the physical properties of cryogens and insulators and the physical and electrical properties of normal metals and superconductors.

An excellent overview of superconducting magnet design with a lot of current information on HTS.

If you are about to learn the basics of superconducting magnets, you must have this book. The author is one of the best engineers in this area.

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