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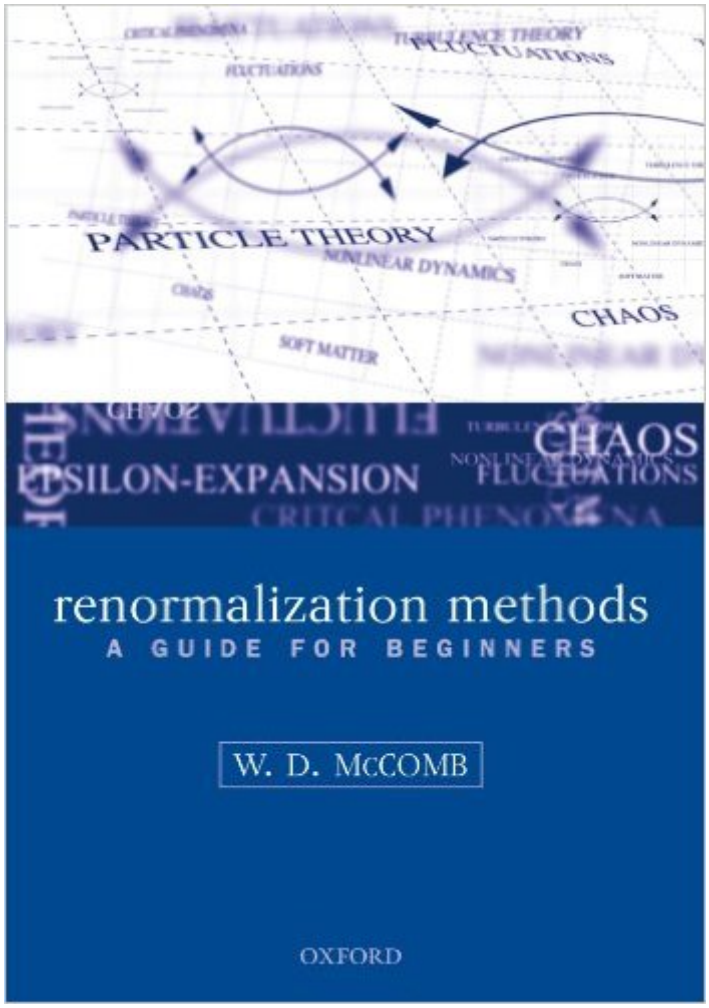
Renormalization Methods: A Guide For Beginners



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Synopsis

This book is unique in occupying a gap between standard undergraduate texts and more advanced texts on quantum field theory. It covers a range of renormalization methods with a clear physical interpretations (and motivation), including mean fields theories and high-temperature and low-density expansions. It then process by each steps to the famous epsilon expansion, ending up with the first-order corrections to critical exponents beyond mean-field theory. Nowadays there is widespread interest in applications of renormalization methods to various topics ranging over soft condensed matter,engineering dynamics, traffic queuing and fluctuations in the stock market. Hence macroscopic systems are also included with particular emphasis on the archetypal problem of fluid turbulence. The book is also unique in making this material accessible to readers other than theoretical physics, as it requires only the basic physics and mathematics which should be known to most scientists, engineers and mathematicians.

Book Information

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Customer Reviews

Incredibly informative. Shows you the "tricks" about how to be a theoretical physicist. Just like being a virtuoso in music there are tricks and shortcuts in theoretical physics that don’t always get shared in the classroom or "God forbid!" in a textbook!.Herein McCombProvides the reader with the necessary confidence to forge ahead in a difficult field of research.(For example how to calculate a "self-energy" term.)That is the writer talks directly to the reader. By that I mean the writer discusses with the reader on "how to proceed" in a calculation say that no one has done before. That is he is

not just teaching in a normal textbook style but rather is teaching (or instructing) how to do research. Not always the same thing as just sitting in a classroom and "watching the professor do it". He is giving the student a chance to learn the "sixth sense" of doing calculations in theoretical physics.The author is careful to point out the differences between the "Mean Field Approximation" and the "Self consistent assumption".Please note that a lot of these "tricks" or insights are provided in strategically place footnotes throughout the book. One of my favorites is on page 298. That point was never explained when I took Statistical Physics. The book is chalk full of useful pointers like that.Also the trick with the convolution for Fourier Transforms and solving for the Green's function is done early on. see p. 28 This again was never explained when I took Mathematical Physics. We were back in the "stone age" with "Separation of Variables". This book is literally a "God-send".From the very rich and diverse selection of topics one can then oneself go onto imagine many new applications for this technique called "Renormalization". The use of subtle and powerful methods to avoid singularities (infinities) in field theory calculations.A "ton" of physics in this book! Done in the singularly beautiful style of theoretical physics.With Best Regards and ThanksSouthern Jameson Westp.s. back in the 60's and before you would have never encounterd a book like this...well maybe, but it would be highly doubtful. In those days nobody it seemed wanted to show you "the tricks".

This is one of the best physics texts I have ever read. In almost every case, the term's "Introduction" or "Elementary" or "Beginner" in the title of a book are a lie, but not this time. You will need some mathematical background (Linear Alg, Diff Eq, Fourier Transforms, etc.) and it would be advisable to have heard of a partition function before, but the combination of readability and fascinating subject matter can't be beat. If you're a little curious about what all this renormalization jazz is about, or have hit a wall in understanding your cryptic QFT text's explanation of the RG group, give this one a go. From what I've seen so far, the statistical mechanic viewpoint of renormalization is 100x more pedagogical than the particle physicists viewpoint.

The renormalization group approach is one of the cornerstones of statistical and theoretical physics. Its impact in these areas has been huge and as a consequence it has also permeated into other fields, such economics, neuroscience or sociology, as the method has been able to approach rather difficult problems. But in spite of its relevance there are few textbooks where you can find a reasonable introduction (a real one) to the method without being previously an expert. This book is an excellent example and I am enjoying it very much. Very recommendable, including all standard

examples (space renormalization, percolation, ising model) together with some non-standard, very pedagogical ones. It goes into the deep methods in a rather smooth sequence.

Very well written book, but a lot of misprints (missing word at the beginning of a line), for example, lines 8,12, and 19 of section 1.2.2 on P.11. more can be found on P.19, P.31,37,59,77,79,97,111,113,123,131,185,191,247,267, 275, 277,279,285, 289, 297, 299,311

The copy I got from (Oxford University Press) has numerous misprints (missing word at the beginning of a line), with occasional real typos.The book is well written.

Very nice introductory book, but really bad quality of printing... lots of misprints and missing words everywhere...

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