

Preface

This book grew out of lectures at Virginia Tech. in 1989-1991, and continued at King's College London. The first half is suitable as a text for a course of one semester, being part of a programme for students of mathematics or physics pursuing a degree at the level of the M. Sc., M. Sci., M. Phys. or M. Math. The second half, which is undoubtedly harder, might be used as a course-book for a more challenging course or as a source for project work at the M. Sc. level, or as a guide to research work leading to the M. Phil.

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Preface to the Second Edition

This edition is larger and, it is hoped, more accurate than the first edition. The notation has been simplified. The author thanks R. Balian for his remark that information can be lost to inaccessible parts of a large system, thus leading to entropy increase of the reduced dynamics. He thanks F. Leppington for the remark that any theory of fluid dynamics without a velocity field 'has not got off the ground'. He thanks M. R. Grasselli for a critical reading of the first edition, and comments. Thanks are also due to

H. Brenner for sending him his work on diffusion in the continuity equation. Thus, the new chapter on fluid dynamics has been added. Another new chapter reinterprets the work of W. De Roeck, T. Jacobs, C. Maes and K. Netočný, on their quantum Kac model, as the proof that the von Neumann entropy increases along the approximate dynamics. The extra pages on information dynamics were made possible by visits to the Science University of Tokyo, CNRS Luminy, the University of Madeira, the Erdos Institute Budapest, the University of Sao Paulo, Torino Politecnico, and MaPhySto Aarhus. The author is indebted to M. Ohya, S. Watanabe, H. Hasegawa, F. Combe, H. Nencka, D. Petz, W. Wrezsinski, G. Pistone, P. Gibilisco, and O. Barndorff-Nielsen for help and discussions. The extra work on chemistry was done while the author was at the Polytechnic, Helsinki; he thanks Prof. Nieminen for the invitation, and for correcting his version of the Arrhenius law. Any remaining errors are the responsibility of the author.

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