

Preface

The present volume is a collection of reprints related to recent developments in the theory of knots arising from the discovery of the Jones polynomial. The papers are grouped into six chapters. A relation between new link invariants and statistical mechanics was already implicit in the original work of V. Jones. A systematic study of constructing link invariants from solutions to the Yang-Baxter equation has been pursued afterwards, and this new progress also revealed a striking relation among link invariants, quantum groups and monodromy of conformal field theory. On the other hand, the Jones polynomial and its relatives have also presented a powerful tool for classical problems in knot theory which were not accessible before this discovery.

Since articles concerning these subjects are scattered in journals of many different domains including both mathematics and physics, we hope that this volume is helpful for the readers to get a perspective on these new developments. A reprint volume on the Yang-Baxter equation is also being prepared by M. Jimbo. One finds a rather extensive bibliography at the end of the present volume, in which we tried to cover the following subjects:

- (1) general aspects on braid groups and mapping class groups;
- (2) new link polynomials and their applications;
- (3) relations among link polynomials, the Yang-Baxter equation and quantum groups;
- (4) monodromy representations of conformal field theory.

Concerning classical literatures on knot theory and braid groups until about 1985, the readers may refer to the references in the books [31] and [62]. As for the Yang-Baxter equation, solvable lattice models and quantum groups, a more extensive bibliography can be found at the end of the reprint volume edited by M. Jimbo. Although we hope that the collection of references to the works on new link polynomials is at least dense, we still feel that we could not give a proper credit to many important contributions to the above subjects. We would like to apologize for that to the authors.

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