Preface

Recently, a variety of results on the complexity status of the graph isomorphism problem has been obtained. These results belong to the so-called *structural* part of Complexity Theory. Our idea behind this book is to summarize such results which might otherwise not be easily accessible in the literature, and also, to give the reader an understanding of the aims and topics in Structural Complexity Theory, in general.

The text is basically self contained; the only prerequisite for reading it is some elementary knowledge from Complexity Theory and Probability Theory. It can be used to teach a seminar or a monographic graduate course, but also parts of it (especially Chapter 1) provide a source of examples for a standard graduate course on Complexity Theory.

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Warning:

The reader should be aware that many of the results in this book are stated as an implication, using an unproven hypothesis, like $\mathsf{P} \neq \mathsf{NP}$, as a premise, and would become immaterial if $\mathsf{P} = \mathsf{NP}$ should ever be proved. Similar, but not as strong consequences (for this book) would follow from a proof that graph isomorphism is in P. On the other hand, we believe that many of the techniques presented here are interesting in their own, independent of the status of the $\mathsf{P} =?\mathsf{NP}$ question.