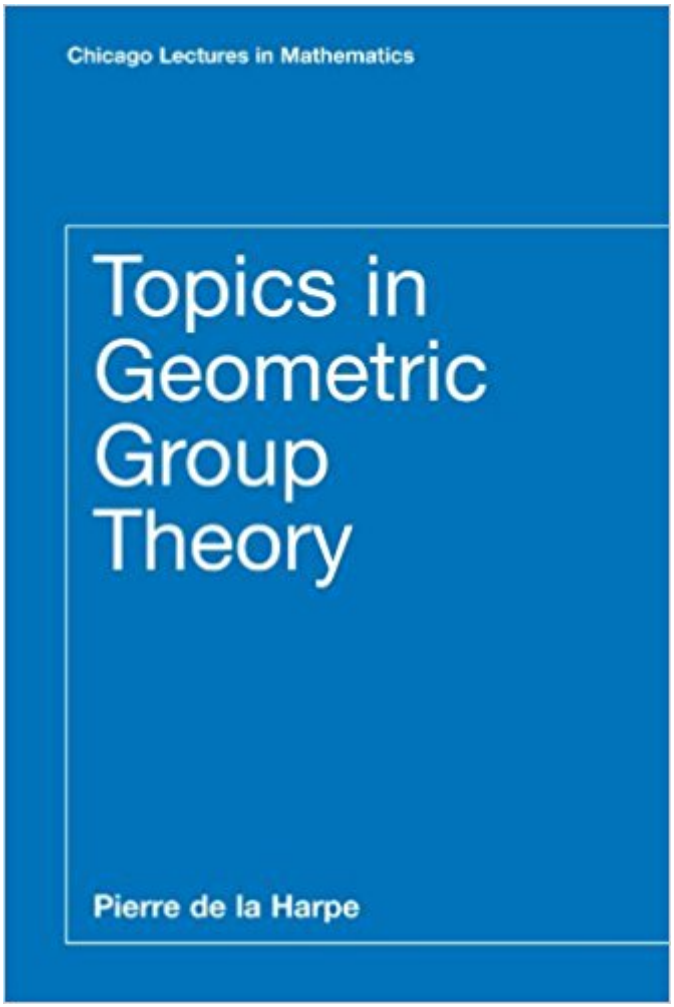
Topics In Geometric Group Theory (Chicago Lectures In Mathematics)



Synopsis

In this book, Pierre de la Harpe provides a concise and engaging introduction to geometric group theory, a new method for studying infinite groups via their intrinsic geometry that has played a major role in mathematics over the past two decades. A recognized expert in the field, de la Harpe adopts a hands-on approach, illustrating key concepts with numerous concrete examples.The first five chapters present basic combinatorial and geometric group theory in a unique and refreshing way, with an emphasis on finitely generated versus finitely presented groups. In the final three chapters, de la Harpe discusses new material on the growth of groups, including a detailed treatment of the "Grigorchuk group." Most sections are followed by exercises and a list of problems and complements, enhancing the book’s value for students; problems range from slightly more difficult exercises to open research problems in the field. An extensive list of references directs readers to more advanced results as well as connections with other fields.

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Customer Reviews

Groups as abstract structures were first recognized by mathematicians in the nineteenth century. Groups are, of course, sets given with appropriate "multiplications," and they are often given together with actions on interesting geometric objects. But groups are also interesting geometric objects by themselves. More precisely, a finitely-generated group can be seen as a metric space, the distance between two points being defined "up to quasi-isometry" by some "word length," and

this gives rise to a very fruitful approach to group theory.In this book, Pierre de la Harpe provides a concise and engaging introduction to this approach, a new method for studying infinite groups via their intrinsic geometry that has played a major role in mathematics over the past two decades. A recognized expert in the field, de la Harpe uses a hands-on presentation style, illustrating key concepts of geometric group theory with numerous concrete examples.The first five chapters present basic combinatorial and geometric group theory in a unique way, with an emphasis on finitely-generated versus finitely-presented groups. In the final three chapters, de la Harpe discusses new material on the growth of groups, including a detailed treatment of the "Grigorchuk group," an infinite finitely-generated torsion group of intermediate growth which is becoming more and more important in group theory. Most sections are followed by exercises and a list of problems and complements, enhancing the book’s value for students; problems range from slightly more difficult exercises to open research questions in the field. An extensive list of references directs readers to more advanced results as well as connections with other subjects.

Pierre de la Harpe is a professor of mathematics at the UniversitÃ© de GenÃ¨ve, Switzerland. He is the author, coauthor, or coeditor of several books, including La propriÃ©tÃ© (T) de Kazhdan pour les groupes localement compacts and Sur les groupes hyperboliques d’aprÃ¨s Mikhael Gromov.

If I had to give a one sentence review of this book, it would simply be "Read this book to get smarter." I’m a little less than half-way through a casual reading of it, but I can already tell that it’s a book that will be worth it no matter how much time I come back and devote to it.Where this book really shines is in the staggering number of examples, both in the exercises and in the text itself. Many math books suffer from a lack of examples, and what examples there are are often left to be worked out as exercises. Not with this book. Examples honestly play a more prominent role in the text itself than exposition. As far the exercises, there are three classes which are labeled "exercises, problems, and compliments." The exercises are at the level where any graduate student with sufficient background should not have a too difficult a time with them. The problems and compliments can be harder exercises, potential research projects, or discussions on the literature. Moreover, the exercises are presented in an interesting way... They aren’t simply, "Prove such and such..." Most exercises are accompanied by a large amount of motivation, and by the time you finish reading the problem, you’re left really wanting to solve it...As far background required, it varies substantially. The reader should at least be familiar with the basics of group theory and algebraic topology. Otherwise, the background required for each example is diverse, so if you don’t

understand one I'd suggest just going to the next one.In mathematics, examples are the primary means of building motivation, intuition, and creativity for any area. While this book may not give you a lot by way of theory, you will come out of it with a much clearer and more visual understanding of groups. I can't recommend it enough.

Worst index ever. There are no page numbers numbers referencing where to find the subject you are looking for. Only Chapter and then number of the example and/or theorem. Tons of information, no order in which to find it. If there was an order, I missed it which is entirely possible.

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