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Sinopsis

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Model theory investigates mathematical structures by means of formal languages. These so-called first-order languages have proved particularly useful. The text introduces the reader to the model theory of first-order logic, avoiding syntactical issues that are not too relevant to model-theory. In this spirit, the compactness theorem is proved via the algebraically useful ultraproduct technique, rather than via the completeness theorem of first-order logic. This leads fairly quickly to algebraic applications, like Malcev's local theorems (of group theory) and, after a little more preparation, also to Hilbert's Nullstellensatz (of field theory). Steinitz' dimension theory for field extensions is obtained as a special case of a much more general model-theoretic treatment of strongly minimal sets.
The final chapter is on the models of the first-order theory of the integers as an abelian group. This material appears here for the first time in a textbook of introductory level, and is used to give hints