

Formal Concept Analysis

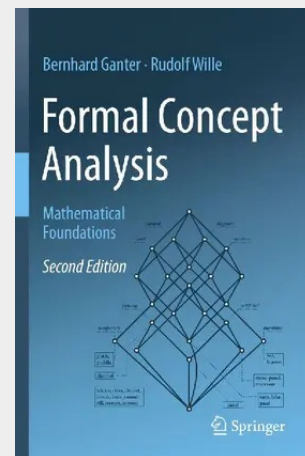
Mathematical Foundations

Formal Concept Analysis is a field of applied mathematics based on the mathematization of concept and conceptual hierarchy. It thereby activates mathematical thinking for conceptual data analysis and knowledge processing. The underlying notion of "concept" evolved early in the philosophical theory of concepts and still has effects today. In mathematics it played a special role during the emergence of mathematical logic in the 19th century. Subsequently, however, it had virtually no impact on mathematical thinking. It was not until 1979 that the topic was revisited and treated more thoroughly.

Since then, Formal Concept Analysis has fully emerged, sparking a multitude of publications for which the first edition of this textbook established itself as the standard reference in the literature, with a total of 10000+ citations. This is the second edition, revised and extended, of the textbook published originally in German (1996) and translated into English (1999), giving a systematic presentation of the mathematical foundations while also focusing on their possible applications for data analysis and knowledge processing. In times of digital knowledge processing, formal methods of conceptual analysis are gaining in importance. The book makes the basic theory for such methods accessible in a compact form, and presents graphical methods for representing concept systems that have proved themselves essential in communicating knowledge.

The textbook complements each chapter with further notes, references and trends, putting the work in modern context and highlighting potential directions for further research. Additionally, the book contains an entirely new chapter on contextual concept logic, including a section on description logics and relational concept analysis. As such, it should be a valuable resource for students, instructors and researchers at the crossroads of subject areas like Applied and Discrete Mathematics, Logics, Theoretical Computer Science, Knowledge Processing, Data Science, and is meant to be used both for research and in class, as a teaching resource.

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