# Developing non-monotonicity in formal concept analysis

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## 1 INTRODUCTION

Formal concept analysis (FCA) provides a framework, grounded in lattice theory, for mathematically reasoning about *formal concepts* and their hierarchies [2–4]. The matter of *concepts* has largely been a Philosophical concern; and the notion of a concept as the dualism between *intension* and *extension* has foundations in Aristotle's *Organon* and, much later on, in the *Logic of Port-Royal* [1, 4]. In this view, the extension of a concept refers to those "things" which one might point to as instances of the concept. Dually, intension describes the meaning, or sense, of the concept.

Formal concept analysis, which adopts this view of concepts, introduces a *formal context*: a triple consisting of a finite set of objects $G$, and attributes $M$, and a binary relation $I \subseteq G \times H$ indicating that a particular object has a respective property [2, 3]. *Formal concepts* are then pairs of sets which describe the extension and intension, sourced from the context[1]. The set of all concepts, when ordered by the *sub/super-concept* relation, form the *concept lattice* used for analysis.

Another important topic in FCA is the discovery of *implications* pertaining a context [2, 4]. Implications are used to express correspondencies that exist between (sets) of attributes in a given context.

The use Applications of FCA: text mining, web mining, and ontology engineering

## 2 BACKGROUND

### 2.1 Formal Concept analysis

### 2.2 Classical Notions of Consequence

### 2.3 Non-monotonic Consequence

## 3 MOTIVAION AND OBJECTIVES

[1]Hereafter, the term 'Formal' will be omitted, and 'Concept' and 'Context' will refer to 'Formal Concept' and 'Formal Context,' respectively, unless otherwise specified.

# REFERENCES


[1] Charles Castonguay. 2012. *Meaning and existence in mathematics*. Vol. 9. Springer Science & Business Media.

[2] B Ganter. 1999. Formal Concept Analysis: Mathematical Foundations. (1999).

[3] Bernhard Ganter, Sergei Obiedkov, Sebastian Rudolph, and Gerd Stumme. 2016. *Conceptual exploration*. Springer.

[4] Sebastian Rudolph. 2007. *Relational exploration. Combining description logics and formal concept analysis for knowledge specification.*