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<<自然约束语言>>

图书基本信息

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内容概要

The NCL Natural Constraint Language presents the NCL Language which is a description language in conventional mathematical logic for modeling and solving constraint satisfaction problems.NCL differs from other declarative languages:It models problems naturally in a simplified form of first-order logic with quantifiers,Boolean logic,numeric constraints,set operations and logical functions;it solves problems by mixed set programming over the mixed domain of real numbers,integers,Booleans,dates/times,references,and in particular sets.The book uses plenty of examples and tutorials to illustrate NCL and its applications.It is intended for researchers and developers in the fields of logic programming,constraint programming,optimization,modeling,operations research and artificial intelligence,who will learn from a new programming language and theoretical foundations for industrial applications. Dr.Jianyang Zhou is the inventor of NCL and has worked for its industrialization for more than 10 years.

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插图：2.1 Data TypesBefore the presentation of the grammar in Chapter 3, an overview of basic data types shows some differences between NCL and other computer languages.2.1.1 GeneralityNCL supports four basic data types: Boolean, float, integral and set of integrals. The integral type includes data types of integer, date time, string and reference which all reduce internally to the integer type. A reference is a logical pointer to a Boolean, a float, an integral or a set expression. Therefore, a set can be a set of integers, a set of dates/times, a set of strings, or a set of references.This book studies the NCL grammar by using bool, float, integral and set to represent respectively Boolean, float, integral and set expressions. NCL's basic data types are outlined in Table 2.1.2.1.2 SetSets are one of the most fundamental concepts in mathematics (Halmos 1960). So it is important to introduce set concepts (e.g., set types and set operations) and set reasoning into a problem-solving system. On this aspect, some researches on logi- cal sets can be found in (Gervet 1997; Zhou 1998).In NCL, the elements of a set can be any data of the integral type: integer, date/time, string, reference, etc.Thanks to sets, quantifiers are introduced in NCL; aggregate functions are powerful in NCL; user-defined functions are flexible in NCL.Set being a compact data type, set programming makes problem modeling simple and concise. With set programming as one of the main features, Mixed Set Programming (Zhou 2008) forms NCL's algorithmic framework.

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