

时代教育·国外高校优秀教材精选

(英文版)

CNC编程原理与应用

CNC Programming
Principles and Applications

(美) 迈克·马特森(Mike Mattson) 著



机械工业出版社
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Mike Mattson

CNC Programming: Principles and Applications

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出版说明

随着我国加入 WTO，国际间的竞争越来越激烈，而国际间的竞争实际上也就是人才的竞争、教育的竞争。为了加快培养具有国际竞争力的高水平技术人才，加快我国教育改革的步伐，国家教育部近来出台了一系列倡导高校开展双语教学、引进原版教材的政策。以此为契机，机械工业出版社近期推出了一系列国外影印版教材，其内容涉及高等学校公共基础课，以及机、电、信息领域的专业基础课和专业课。

引进国外优秀原版教材，在有条件的学校推动开展英语授课或双语教学，自然也引进了先进的教学思想和教学方法，这对提高我国自编教材的水平，加强学生的英语实际应用能力，使我国的高等教育尽快与国际接轨，必将起到积极的推动作用。

为了做好教材的引进工作，机械工业出版社特别成立了由著名专家组成的国外优秀教材审定委员会。这些专家对实施双语教学做了深入细致的调查研究，对引进原版教材提出许多建设性意见，并慎重地对每一本将要引进的原版教材一审再审，精选再精选，确认教材本身的质量水平，以及权威性和先进性，以期所引进的原版教材能适应我国学生的外语水平和学习特点。在引进工作中，审定委员会还结合我国高校教学课程体系的设置和要求，对原版教材的教学思想和方法的先进性、科学性严格把关。同时尽量考虑原版教材的系统性和经济性。

这套教材出版后，我们将根据各高校的双语教学计划，举办原版教材的教师培训，及时地将其推荐给各高校选用。希望高校师生在使用教材后及时反馈意见和建议，使我们更好地为教学改革服务。

**机械工业出版社
高等教育分社**

序

由 Mike Mattson 编著的 “CNC Programming: Drinciples and Applications” 一书出版于 2002 年。该书的定位是为希望获得数控编程知识, 提高编程水平的大专院校工科学生, 以及为机械师、机床操作者提供一本内容简明扼要, 实用性强的教课书。书中内容覆盖了数控机床及数控加工的基础知识, 必要的数学知识; 数控零件编程概念; 铣削中心和车削中心的高级编程概念和技术等。突出讲述了 G、M 代码编程指令和 FANUC 系统编程语言。并且在附录中还提供了更多有用的参考资料。本书内容完整, 自成体系, 是一本很好的教材和教学参考书。

该书还具有以下一些特点:

(1) 与其他编程书籍不同, 该书从数控加工任务的规划到对数控加工件的编程作了系统的叙述, 并提供了数控编程必要的预备知识, 包括三角学、进给速度和走刀量、CNC 控制及刀、夹具等, 系统性强。

(2) 在叙述方法上, 该书既综合讲述了代码的编程方法, 又讲述了针对铣销、车销、各种固定加工循环等具体加工方式的编程, 其中还讲述了刀具和工件的安装和调整、刀具补偿、CAD/CAM 等专题内容。该书对数控加工编程所涉及的内容论述完整, 安排合理。

(3) 在编程风格上, 该书以市场占有率比较大的 FANUC 系统为主, 因而具有权威性, 先进性和适应性强的特点。

(4) 该书图文并茂, 并穿插了大量编程实例, 包括短代码编程实例和完整的零件加工编程实例。这样不仅对个别特殊的, 而且对完整的编程概念都更加容易理解和掌握, 使该书易懂易学。

(5) 该书每章的开头都列出能从本章学到的知识点, 结束都有总结, 并附有习题, 很适合于教学和自学。

(6) 特将本书目录、索引翻译成中文, 以便于读者学习。

鉴于上述, 该书很适合用作大、专院校机械工程与自动化专业及相关专业的双语教材, 同时也比较适合作为高职学校数控技术应用专业的英文教材或教学参考书。该书对数控领域的工程技术人员也颇具参考价值。

任玉田
北京理工大学

Preface

This book is intended for the individual who has little or no experience in programming Computer Numerical Controlled (CNC) machine tools. My goal in this writing is that such an individual will be able to self-teach him- or herself the fundamentals of CNC programming by following the text, studying the examples, and completing the practice programming exercises.

The target audience for this book is high school and community college technical students, machine operators who wish to advance in their job or simply have a better understanding of it, or anyone else who seeks to learn CNC programming as quickly and efficiently as possible.

I have intentionally kept this work short and concise with the hope that the reader will not be overwhelmed and will continue through to the end. The reader who does complete this study will walk away with the skills and preparation needed to become an entry-level CNC programmer.

FEATURES

CNC Programming: Principles and Applications is a book that machinists and machine operators can use to learn to program CNC machine tools such as milling centers. Its focus is on the most commonly used language in industry—G & M code programming, or Fanuc-style programming.

CNC Programming: Principles and Applications is presented in three sections. The first section provides the groundwork for modern manufacturing and takes the reader through the fundamentals of CNC machine tools, manufacturing processes, and technical mathematics. The second section introduces the concept of NC part programming and presents the fundamental aspects of the language over four chapters. The last section provides advanced programming concepts and techniques for the milling center and lathe. Additional reference materials are provided in the appendices so *CNC Programming: Principles and Applications* can serve as a standalone resource for a CNC programming class or teaching unit.

CNC Programming: Principles and Applications is different than other programming books in that it follows a systematic path from planning to programming an NC machining job. Additionally, this work provides material that is a prerequisite for NC programming, including trigonometry, speeds and feeds, CNC control, and tooling. The assumption is that the reader has some conventional machining experience but has not had additional academic preparation that is required in programming.

In addition to the previously mentioned features, *CNC Programming: Principles and Applications* also provides the following:

Illustrations Graphics comprise the language of communication in manufacturing technology. This title contains numerous illustrations that enhance the ideas presented in the text.

Programming Examples Programming examples cement together concepts that, on the surface, seem to be disjointed. This book includes short code examples to illustrate specific topics, and complete part programs that illustrate the interrelation of the smaller concepts. This combination makes it easy to understand the small pieces as well as the whole picture.

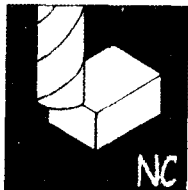
Chapter Questions The chapter questions provide a learning assessment of the most important topics. Many proven programming problems are also provided to allow the reader to develop confidence in writing code.

Technical Mathematics Material This is a necessary but often neglected subject in NC programming. Most students are underprepared for even the most basic trigonometry and geometry that are used in programming.

Programming Software and Web Resources In addition to the text, several other value-added resources are available. AutoEditNC is available for free download from the internet. AutoEditNC is a software program that makes it easy to learn CNC programming. The software provides a specialized NC text editor, program templates, and code creation tools that make it easy to start writing NC programs. AutoEditNC also includes a simulation module that displays a graphical backplot of the finished NC toolpath so that mistakes can be found and corrected easily.

The software and other resources can be found on the *CNC Programming: Principles and Applications* web site at the following address:

www.delmar.com/mattson



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