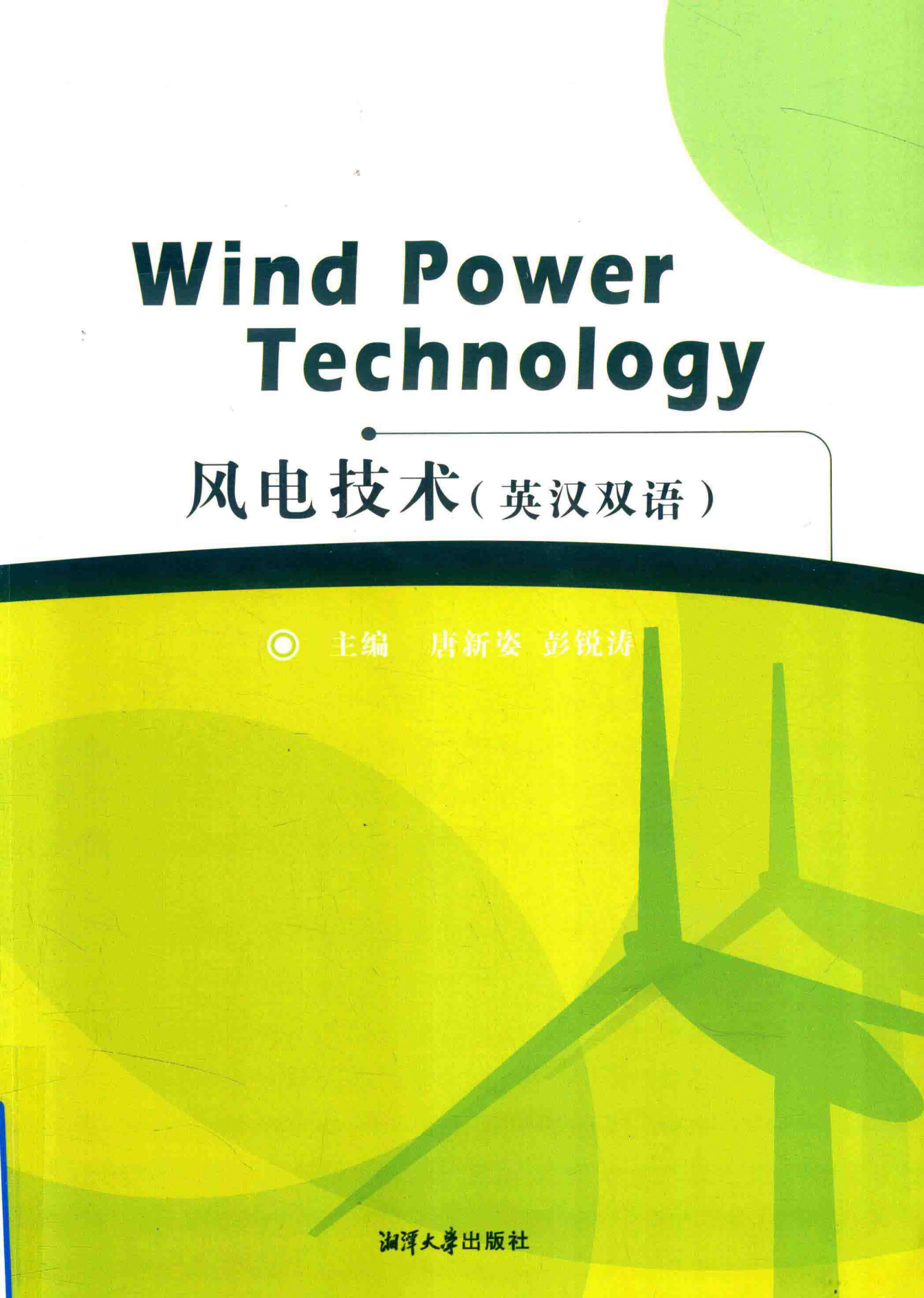
Wind Power Technology

风电技术（英汉双语）

主编　唐新姿　彭锐涛



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风电技术

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内容提要

本书是按照高等工科教育逐步与国际教育接轨的要求编写的风电技术英汉双语书籍，旨在培养风能与动力工程领域具有扎实理论基础、较强实践和创新能力以及具有国际交流能力的高级工程技术人才，体现国内教学基本要求的同时，吸取了国外同类教材的特点。全书共10章，主要阐述了风力发电原理、风资源评估、空气动力学理论、风力机设计与分析、制造及测试、力学与动力学、风力机结构、电气系统与控制、风电场与经济性分析等方面知识。

本书可作为高等院校风能与风电技术、新能源科学与工程、能源与动力工程等专业本科生、研究生学习的相关教材，特别适合作为英汉双语教材，也可作为从事风能领域的工程技术人员参考用书。

Preface

Wind energy is one of the most important renewable energy in the future, which is of great significance for energy crisis mitigation and environment improvement. With the rapid development of technology and social progress, renewable energy related subjects in colleges and universities are rising rapidly, cultivating more and more professionals in wind power has become an urgent demand. At the same time, with increasing international exchanges and cooperation, talents with higher international competence are highly required. Bilingual teaching in higher education is an important approach for China's higher education with international standard and an effective way to cultivate high-quality international talent. Based on the "Excellent Engineer Training Program" and the syllabus of wind power technology, combining the cutting-edge of wind power and the teaching experience in course construction, we have compiled this bilingual textbook on wind power technology so as to provide a better teaching resource for bilingual teaching.

As a professional book, the basic theory and method of wind power technology are taken as the main line of this book. Both the traditional technology and hot issues in current research and advanced technology are also introduced, and thus the curriculum hierarchy of wind power technology is constructed in this book. The characteristics of this book are as follows:

(1) Integral knowledge hierarchy. The book covers the basic principle of wind power, wind resources, wind turbine design manufacturing and testing, analysis, mechanics and dynamics of wind power system, wind farm and economics, which is of wide scope, easy to understand, properly illustrated, and thus the key technologies of wind turbine system are thoroughly introduced.

(2) New compiling system. The book is written in both English and Chinese, which is not only suitable for the teaching in English, but also for the teaching in bilingual

classes as well as in ordinary classes. The students can not only learn the professional terms and knowledge in wind power technology field, but also improve the professional English level and lay a solid foundation for international communication in this field.

(3) Strong practicability. This book emphasizes basic theories, methods and the training of skills, reflects the basic requirements of domestic teaching and absorbs the characteristics of similar foreign materials. Each chapter is equipped with supporting exercises, and the content focuses the training purpose of combination of theory and practice, so as to improve the ability to solve engineering problems.

(4) Wide application. This book is based on the teaching thought of "people-oriented", has modular chapters and flexibility content with prominent key points and clear theme, which is introduced step by step, thus it probably fits the different needs of undergraduate and graduate students, engineers at different levels.

This book was overall compiled and edited by Xinzi Tang and Ruitao Peng of Xiangtan University. The authors of the manuscript are as follows: Xinzi Tang (Chapters 1,2,3,4 and 5); Ruitao Peng(Chapter 8); Rui Chen of Xiangtan University (Section 1,2 of Chapter 6 and Chapter 10); Congfang Hu of Xiangtan University (Section 3 of Chapter 6 and Chapter 7); Sisi Liu of Xiangtan University (Chapter 9).

During the compilation of the manuscript, graduate students Xuanqing Huang, Songfeng Sun, Pengcheng Li, Yueqian Wu and Xinyu Lu of Xiangtan University offered valuable help and here we announce our acknowledgement for the assistance.

Sincere thanks go to wind power and renewable expert Professor Xiongwei Liu in the UK for the thorough review and significant contributions.

Some textbooks published domestic and abroad were used as the references during the compilation, for which we express most cordial thanks to the authors. We also announce our sincerely acknowledgement to all those who have provided their help and kindness for publication of this book.

This book is financially supported by the Graduate Textbook Publishing Fund of Xiangtan University. We hereby express our sincere thanks to the support.

Due to various limitations, there may be some improper contents or even mistakes in this first edition. Criticisms and corrections from all experts and readers are gratefully welcome.

Xinzi Tang & Ruitao Peng in Xiangtan University

前　言

风力发电作为最重要的新能源之一，对于缓解能源匮乏和改善环境等具有重要意义。随着社会进步与工程技术快速发展，高等院校新能源相关专业迅速兴起，培养更多从事风力发电方面的专门技术人员成为当前迫切需求。同时，在面向日益增强的国际交流与合作的今天，社会对具有国际竞争力人才的需求越来越高。高等教育双语教学是我国高等教育与国际教育接轨的一项重要举措，是培养高素质国际人才的有效途径。根据“卓越工程师培养方案”和风电技术教学大纲，将风电技术最新前沿与课程建设教学经验相结合，作者编写了这本风电技术双语教材，旨在为双语教学提供优质教学资源。

针对专业课程特点，本书编写以风电技术的基础理论和方法为主线，在介绍传统技术的同时还介绍了一些当前研究热点问题和先进技术，系统地构建了风电技术的课程体系。本书具有以下特色：

(1) 知识体系完整。本书全面介绍了风力发电原理、风资源评估、空气动力学理论、风力机设计与分析、制造及测试、力学与动力学、风力机结构、电气系统与控制、风电场与经济性分析等内容，覆盖范围广，深入浅出，图文并茂，还系统介绍了风力机系统关键技术。

(2) 编写体系新颖。本书采用英汉双语编写，适合全英文教学，也适合双语和普通班教学。通过阅读本书，学生不仅可以学到风电技术领域的专业术语和知识，还可以提高专业英语水平，为本专业国际交流奠定坚实基础。

(3) 实用性强。本书注重基本理论、方法和技能的培养。编写时，在体现国内教学基本要求的同时吸取国外同类教材特点。每章设置配套习题，突出理论与实践相结合的训练目的，以提高解决工程实际问题的能力。

(4) 适用范围广。充分体现“以人为本”的教学思想，本书结构“模块化”，内容“弹性化”，重点突出，主题鲜明，循序渐进，可以适应本科生、研究生、工程人员等不同层次的不同需求。

本书由湘潭大学唐新姿、彭锐涛负责统稿。各章作者如下：唐新姿（第1、2、3、4、5章）；彭锐涛（第8章）；湘潭大学陈睿（第6章第1、2节、第10章）；湘潭大学胡聪芳（第6章第3节、第7章）；湘潭大学刘思思（第9章）。

本书的编写得到了研究生黄轩晴、孙松峰、李鹏程、吴玥千、陆鑫宇等的帮助，在此表示感谢！

全书由英国风电与新能源专家 Xiongwei Liu 教授主审，在此表示由衷的感谢！

本书参考了国内外出版的一些教材，谨此向有关作者表示诚挚的谢意！并向所有关心和帮助出版的人士表示感谢！

本书的出版得到了“湘潭大学研究生教材资助项目”的资助，在此表示衷心的感谢！

由于编者水平有限，书中难免存在错漏与不当之处，敬请广大读者批评指正。

唐新姿 彭锐涛 于湘潭大学

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