# 新编机电英语

高等教育应用型重点专业规划教材

New English Course in Electromechanics

丛书主编 冯光华

胡杨 关荆晶 陈 斯 主 编 贾 文 副主编



# New English Course in Electromechanics

# 新编机电英语

丛书主编: 冯光华

主编:胡杨 关荆晶 陈 斯

副主编: 贾 文



#### 图书在版编目(CIP)数据

新编机电英语 / 胡杨,关荆晶,陈斯主编. 一天津: 天津大学出版社,2018.5 高等教育应用型重点专业规划教材 / 冯光华主编

ISBN 978-7-5618-6130-1

I . ①新 ··· II . ①胡 ··· ②关 ··· ③陈 ··· III . ①机电工程 - 英语 - 高等 学校 - 教材 IV . ① TH

中国版本图书馆 CIP 数据核字 (2018) 第 103939 号

出版发行 天津大学出版社

地 址 天津市卫津路 92 号天津大学内(邮编: 300072)

电 话 发行部: 022-27403647

网 址 publish. tju. edu. cn

印 刷 天津泰宇印务有限公司

经 销 全国各地新华书店

开 本 185mm×260mm

印 张 7.25

字 数 201 千

版 次 2018年5月第1版

印 次 2018年5月第1次

定 价 25.00元

凡购本书,如有缺页、倒页、脱页等质量问题,烦请向我社发行部门联系调换 版权所有 侵权必究

## 丛书编委会

总主编: 冯光华

编 委: (排名不分先后)

吴海燕 田 娟 房明星 胡 杨 严红烨 陈 斯 蔡丽慧 王电兴 陈 王. 莹 李璐瑶 招 左 帆 李 杨永华 游 罗 莉 李 张馨引 杨 李丽花 张 慧 黄亚楠 王 晓 潘婷婷 陈霞 李 娈 陈 霞 芦佳蔡 喆 黄 莉 王华英 胡 玪 张培芳 管春梅 刘 薛海琴 贾 文 孙川慧 阿 李 萍 关荆晶 何丽荣 毛兆婷 段友国 唐 丹 石立国

# 《新编机电英语》编委会

主 编: 胡 杨 关荆晶 陈 斯

副主编: 贾 文

编者:陈招王莹李璐瑶黄莉

# PREFACE



《机电英语》作为校内教材使用的时候,得到了广大读者的肯定,并受到了广大学生的好评。与此同时,我们也收到了武汉工程科技学院机电学院相关专业师生提出的不少宝贵意见。因此,根据编者的教学实践以及与机电行业相关专家合作积累的经验,正式修订并出版了这本《新编机电英语》。

本书主要根据武汉工程科技学院机电学院各专业的英语口语教材和机电英语选修课教材编写而成。在武汉工程科技学院多年教学实践的基础上,编者对上述内容进行了进一步的修改、充实、提高,改编成本书。《新编机电英语》教材遵循"工学结合,能力为本"的教学理念和"实用为主,够用为度"的教学原则编写,以期培养和提高学生实际运用英语语言的能力。全书共8个单元,每个单元分为专业词汇、实用对话、阅读、知识拓展、综合练习等五个部分。其中实用对话部分选择的是职场中的涉外英语内容,设置真实的语境,培养学生的英语交流能力;阅读部分选用与电机机械、机电建模、机电一体化、电子通信、信息技术、云计算、系统工程专业相关的文章。《新编机电英语》内容新颖、通俗、实用,既可以提高学生的语言技能,又有利于培养学生的职业素质与技能。全书图文并茂,集职业性、实用性、适时性和趣味性于一体。这8个单元的内容既自成体系,又互相关联,难度适中,为配合教学,还编有一定量的练习,供学生在课堂内外使用。建议学生在使用时多精读课本,以提高学习效果。

本教材注重英语听说口语练习和专业英语阅读练习,以下主要包含形式。

- 1. 口语练习,训练形式多样,既有对每章主题的相关内容进行双人交流或进行拓展性小组讨论,也有就图表信息或提示信息进行个人陈述等。口语练习的设计旨在培养学生运用英语表达相关专业知识的能力,做到信息输入和信息输出同步进行。
- 2. 专业英语阅读练习,阅读部分选用与电机机械、机电建模、机电一体化、电子通信、信息技术、云计算、系统工程专业相关的文章,每个单元从课文到练习上的设计上由浅入深,既突出了基础知识也强调实际应用,既突出专业特色又能充分体现英语教学的规律,达到语言技能与职业知识技能的整合。

《新编机电英语》适合作为应用技术型高校机电专业的专业英语教材,供应用技术型高校师生使用。

编者

2018年1月

# 目 录

# CONTENT

Unit 1 Electromechanics	1
Unit 2 Mechanical Engineering	12
Unit 3 Industrial Robots	23
Unit 4 Automation in Manufacturing	33
Unit 5 Mechatronics	43
Unit 6 Electronic Communication	54
Unit 7 Information Technology	64
Unit 8 Cloud Computing	75
Key to the Exercises	86

# Unit 1 Electromechanics

#### **Learning Objectives**

After completing this unit, you will be able to do the following:

- 1. Grasp the main idea and the structure of the text;
- 2. Master the key language points and grammatical structure in the text;
- Understand the basic concepts in electromechanics;
- 4. Conduct a series of reading, listening, speaking and writing activities related to the theme of the unit.

#### **Technical Terms**

In this unit, you will learn some technical terms in electromechanics listed below:

- · electrical engineering;
- mechanical engineering;
- electric typewriters;
- digital computers;
- · relays.

#### **Outline**

The followings are the main sections of this unit:

- 1. Warm-up Activity;
- 2. Text A;
- 3. Situational Conversation;
- 4. Reading Comprehension;
- 5. Translation Skills;
- 6. Exercises.

#### Vocabulary

Listed below are some words appearing in this unit that you should make part of your vocabulary:

- · microcontroller;
- · traffic lights:
- · washing machines;
- · telegraphy;
- voltage;
- · encompass;
- integration;
- indefinitely;
- · selectric.

# FLooking Ahead

The purpose of Electro-mechanical Modelling is to model and simulate an electro-mechanical system, so that its physical parameters can be examined before the actual system is built. Parameter estimation and physical realization of the overall system are the major design objectives of electro-mechanical modelling. Theory driven mathematical models can be used for or applied to other systems to judge the performance of the joint system as a whole.

The modelling of pure mechanical systems is mainly based on the Lagrangian which is a function of the generalized coordinates and the associated velocities. If all forces are derivable from a potential, then the time behavior of the dynamic systems is completely determined. For simple mechanical systems, the Lagrangian is defined as the difference of the kinetic energy and the potential energy.

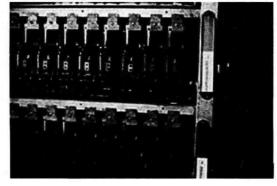
In consequence, we have quantities (kinetic and potential energy, generalized forces) which determine the mechanical part and quantities (co-energy, powers) for the description of the electrical part. This offers a combination of the mechanical and electrical parts by means of an energy approach. As a result, an extended Lagrangian format is produced.

# Introduction

The Lagrangian System is mainly used in the process of modelling of pure mechanical systems.

#### Core Contents

- 1. The discussion of the definition of electromechanics.
- 2. Discussion of the automated telephone exchanges that were widely used in the early days.

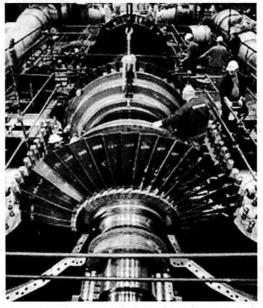


# Warm-up Activity

What was widely used in early automated telephone exchanges?



The solenoid valve



A steam turbine used to provide electric power



# Part One: Text A History of Electromechanics

In engineering, electromechanics combines electrical and mechanical processes and procedures drawn from electrical engineering and mechanical engineering. Electrical engineering in this context also encompasses electronics engineering.

Devices which carry out electrical operations by using moving parts are known as electromechanics. Strictly speaking, a manually operated switch is an electromechanical component, but the term is usually understood to refer to devices which involve an electrical signal to create mechanical movement, or mechanical movement to create an electric signal, often involving electromagnetic principles such as in relays, which allow a voltage or current to control other, oftentimes isolated circuit voltage or current by mechanically switching sets of contacts, and solenoids, by which the voltage can actuate a moving linkage as in solenoid valves. Piezoelectric devices are electromechanical, but do not use electromagnetic principles. Piezoelectric devices can create sound or vibration from an electrical signal or create an electrical signal from sound or mechanical vibration.

Before the development of modern electronics, electromechanical devices were widely used in complicated systems and subsystems, including electric typewriters,

teleprinters, very early television systems, and the very early electromechanical digital computers.

Relays originated with telegraphy as electromechanical devices used to regenerate telegraph signals. In 1885, Michael Pupin at Columbia University taught mathematical physics and electromechanics until 1931.

The Strowger switch, the Panel switch, and similar ones were widely used in early automated telephone exchanges. Crossbar switches were first widely installed in the middle 20th century in Sweden, the United States, Canada, and the Great Britain, and these quickly spread to the rest of the world—especially Japan. The electromechanical television systems of the late 19th century were less successful.

Electric typewriters developed, up to the 1980s, as "power-assisted typewriters". They contained a single electrical component, the motor. The keystroke used to move a typebar directly, but now it engaged mechanical linkages that directed mechanical power from the motor into the type bar. This was also true of the later IBM Selectric. At Bell Labs, in the 1940s, the Bell Model V computer was developed. It was an electromechanical relay-based device; cycles took seconds. In 1968 electromechanical systems were still under serious consideration for an aircraft flight control computer, until a device based on large scale integration electronics was adopted in the Central Air Data Computer.

At the beginning of the last third of the century, much equipment which for most of the 20th century would have used electromechanical devices for control, has come to use less expensive and more reliable integrated microcontroller circuits containing millions of transistors, and a program to carry out the same task through logic, with electromechanical components only where moving parts, such as mechanical electric actuators, are a requirement. Such chips have replaced most electromechanical devices, because any point in a system which must rely on mechanical movement for proper operation would have mechanical wear and eventually fail. Properly designed electronic circuits without moving parts will continue to operate properly almost indefinitely and are used in most simple feedback control systems, and would appear in huge numbers in everything from traffic lights to washing machines.

As in 2010, approximately 16,400 people work as electro-mechanical technicians in the US, about 1 out of every 9,000 workers. Their median annual wage is about 50% more than the median annual wage over all occupations.

# Words and Expressions

procedure	[prəˈsiːdʒə]	n. 程序, 手续; 步骤
be drawn from		从中得到;从提取
encompass	[ın'kʌmpəs; en-]	vt. 包含;包围,环绕;完成
strictly speaking		严格地说; 严格来说
voltage	['voltɪdʒ]	n. [电]电压
current	['kʌr(ə)nt]	n. (水、气、电)流; 趋势; 涌流
solenoid	[ˈsəʊlənɒɪd]	n.[电]螺线管;螺线形电导管
valve	[vælv]	n. 阀; [解剖]瓣膜; 真空管; 活门
relay	[ˈriːleɪ]	n.[电]继电器
originate with		源于
switch	[switʃ]	n. 开关; 转换; 鞭子 vi. 转换; 抽打
		换防
keystroke	['ki:strəʊk]	n. 击键; 按键 **********************************
typebar	['taɪpba:]	n. 铅字连动杆
selectric	[si'lektrik]	n. 电动打字机
		在认真考虑之下
integration	[ıntı'greis(ə)n]	n. 集成; 综合
microcontroller	[ˌmaɪkrəukən'trəulə]	n.[自]微控制器
indefinitely	[ın'definitli]	adv. 不确定地,无限期地;模糊地,
		不明确地
feedback	[ˈfiːdbæk]	n. 反馈; 成果, 资料; 回复
in huge numbers	大量的	

## Exercise 1: Special terms.

1. electrical and mechanical	
2. electrical engineering	
3. mechanical engineering	
4. 电信号	
5. 机械联动装置	- Ta <u>rii, independental en en en e</u> teratur
6. 一个电子元件	16 14 1

# Exercise 2: Answer the following questions.

- 1. What is electromechanics?
- 2. What is a manually operated switch?
- 3. What were widely used in early automated telephone exchanges?
- 4. As in 2010, how many people work as electro-mechanical technicians in the US?

#### Exercise 3: Define the following terms with information from Text A.

- 1. electromechanics
- 2. relay
- 3. microcontroller



# Part Two: Situational Conversation

#### At a Chinese Restaurant

- A: It's very nice of you to invite me.
- B: I'm very glad you could come, Mr. Liu. Would you like to take a seat at the head of the table? It's an informal dinner, please don't stand on ceremony... Mr. Liu, would you like to have some chicken?
- A: Thank you. This is my first time to come to a Chinese restaurant. Could you tell me the different features of Chinese food?
- B: Generally speaking, Cantonese food is a bit light; Shanghai food is rather oily; and Hunan dishes are very spicy, with a strong and hot taste.
- A: Chinese dishes are exquisitely prepared, delicious, and very palatable. They are very good in colour, flavor and taste.
- B: Mr. liu, would you care for another help?
- A: No more, thank you. I'm quite full.
- B: Did you enjoy the meal?
- A: It was the most delicious dinner I've had for a long time. It was such a rich dinner.
- B: I'm so glad you like it.
- A: Thank you very much for your hospitality.

#### Notes:

## At a Chinese Restaurant 在中餐馆

B: I'm very glad you could come, Mr. Liu. Would you like to take a seat at the head of the table? It's an informal dinner, please don't stand on ceremony... Mr. Liu, would you like to have some chicken?

我很高兴您能来, 刘先生, 请您坐在上席吧? 这只是个便饭, 请别客气。刘先生, 您想吃点鸡肉吗?

A: Could you tell me the different features of Chinese food?

您能告诉我中国菜的不同特点吗?

- B: Generally speaking, Cantonese food is a bit light; Shanghai food is rather oily; and Hunan dishes are very spicy, having a strong and hot taste.
  - 一般而言, 广东菜较为清淡; 上海菜比较油腻; 湖南菜非常辣, 热辣十足!
- A: They are very good in colour, flavor and taste.

它们色香味俱全。

A: It was the most delicious dinner I've had for a long time. It's such a rich dinner. 这是我吃过最美味的宴席了,太丰盛了。

#### Exercise 1: Sentence patterns.

- 1. It's very nice of you to invite me.
- 2. Chinese dishes are exquisitely prepared, delicious, and very palatable. They are very good in colour, flavor and taste.
  - 3. Could you tell me the different features of Chinese food?
  - 4. It's an informal dinner.
  - 5 I'm quite full.

## Exercise 2: Complete the following dialogue in English.

A: Now, you are	boarding the plane.	We're sorry	that we have	n't done i	much to h	ielp you
when you are in	n China.					

B: I appreciate what you have done for me. Everything I have seen here has left a deep impression on me. I really don't know how to express my thanks to you.

我们很乐意给你提供帮助。
B:
请代我向张先生和其他的朋友们转达我的谢意好吗?
A: I'd like to. I'm sure your visit will help to promote the friendship and understanding
between us. Welcome to China again.
我一定转达。我坚信你的来访将促进我们双方的友谊和了解,欢迎你再访中国。
B:3
当然, 我会的。好吧, 是告别的时候了, 飞机就要起飞了, 希望你将来有机会来美国。
A:4
谢谢。如果有机会,我会去的。再见,一路平安!
B: Goodbye!

# Part Three: Reading Comprehension

Questions 1 to 5 are based on the following passage.

For years, high school students have received identical textbooks as their classmates. Even as students have different learning styles and abilities, they are force-fed the same materials, "Imagine a digital textbook my book because I'm a different person and learn differently, which is different from yours," said Richard Baraniuk, founder of OpenStax.

OpenStax will spend two years developing the personalized books and then test them on Houston-area students. The books will also go through a review and evaluation process similar to traditional textbooks. Baraniuk expects 60 people to review each book before the publication to ensure its quality.

The idea is to make learning easier, so students can go on to more successful careers and lives. Baraniuk isn't just reproducing physical textbooks on digital devices, a mistake e-book publishers have made. He's seriously rethinking that the educational experience should be in a world of digital tools. To do this means involving individuals with skills traditionally left out of the textbook business. Baraniuk is currently hiring cognitive scientists and machinelearning experts. Baraniuk wants to use the tactics (策略) of Google, Netflix and Amazon to deliver a personalized experience. These web services all rely on complex algorithmsto (算法) automatically adjust their offerings for customers.

Just as Netflix recommends different movies based on your preference and viewing history, a textbook might present materials at different pace. Thanks to machine learning the textbook—which will be stored on a range of digital devices—will automatically adjust itself. As a student learns about a topic, he or she could be interrupted by brief quizzes that evaluate whether he or she masters the area. Depending on how the student does, the subject could be reinforced with more materials. Or a teacher could be automatically emailed that the student is struggling with a certain concept and could use some one-to-one attention.

This personalized learning experience is possible thanks to the wealth of data that a digital textbook can track. The data can be used to better track students' progress during a course. Parents and teachers can monitor students' development and provide more proper assistance in time. With personalized learning methods, our students' talents will be better developed.

- 1. What do we learn about personalized books?
  - A) Their quality will be ensured since they are developed by OpenStax.
  - B) They will be examined and judged before being published.
  - C) They will overlook different learning styles and abilities.
  - D) They will be much similar to traditional textbooks.
- 2. In which aspect have e-book publishers done incorrectly?
  - A) They have only put emphasis on learning experience.
  - B) They have made it difficult to access to e-books.
  - C) They have made it rather boring and inconvenient to learn.
  - D) They have just produced an electronic copy of print textbooks.
- 3. What does Richard Baraniuk mean by "the educational experience should be in a world of digital tools" (Line 3-4, Para. 3)?
  - A) Education should employ the machine to improve learning.
  - B) Education should involve traditional textbooks in the digital world.
  - C) Education should include obtaining skills by adapting machine learning.
  - D) Education should reproduce traditional textbooks on the Web services.
  - 4. Personalized textbooks are beneficial to students because \_\_\_\_\_
    - A) they store the fixed material on different digital machines.
    - B) they quiz the students to make them more confident.
    - C) they automatically present movies based on students' preference.
    - D) they automatically match learning material to students' needs.
  - 5. Personalized learning experience may become possible owing to
    - A) a great amount of digital equipment
    - B) the students' continuous progress
    - C) a great amount of digital information
    - D) parents' and teachers' constant attention



## Part Four: Translation Skills

#### 翻译技巧: 增译法

常用的翻译技巧有增译法、省译法、重复法、转换法、拆句和合并法、正译法、反译法、倒置法、包孕法等。本章着重介绍增译法。

增译法指根据英汉两种语言不同的思维方式、语言习惯和表达方式, 在翻译时

增添一些单词、短语或句子,以便更准确地表达出原文所包含的意思。这种方式多半用在汉译英中。汉语中无主句的情况较多,而英语句子中则一般都要有主语,所以在翻译汉语无主句的时候,除了少数情况可用英语无主句、被动语态或"There be..."结构来翻译之外,一般都要根据语境补出主语,使句子更完整。

英汉两种语言在名词、代词、连词、介词和冠词的使用方法上也存在很大差别。英语中代词使用频率较高,凡说到人的器官和归某人所有的或与某人有关的事物时,必须在前面加上物主代词。因此,在汉译英时需要增补物主代词,而在英译汉时又需要根据情况适当删减。英语中词与词、词组与词组以及句子与句子的逻辑关系一般用连词来表示,而汉语则往往通过上下文和语序来表示这种关系。因此,在汉译英时常常需要增补连词。此外,英语句子也离不开介词和冠词。

在汉译英时还要注意增补一些原文中暗含而没有明言的词语以及一些概括性、 注释性的词语,以确保译文意思的完整。总之,通过增译一是可以保证译文语法结构的完整,二是可以保证译文意思的明确。

- 例 1: In the evening, after the banquet, the concert and table tennis exhibition, he would work on the drafting of the final communiqué.
- 翻译:晚上在参加宴会、出席音乐会、观看乒乓球表演之后,他还得起草最后公报。(增译动词)
- 详解:根据译文意思的需要,可以在名词前增加动词。比如把例 1 中的 after the banquet, the concert and table tennis exhibition 译为 "在宴会、音乐会、乒乓球表演之后",意思就不够明确,而如果在名词之前增加原文中虽无其词却有其意的动词,译为 "在参加宴会、出席音乐会、观看乒乓球表演之后",形成 3 个动宾词组,意思就明确了,读起来也较通顺自然,符合汉语习惯。
- 例 2: O, Tom Canty, born in rags and dirt and misery, what sight is this!
- 翻译: 哦,汤姆·康第,生在破烂、肮脏和苦难中,现在这番景象却是多么煊赫啊! (增译形容词)
- 详解:根据原著,汤姆·康第本是个贫儿,穿上王子服装以后,被人认为真的是王子,就显得特别煊赫。原文虽无"煊赫"的字眼,但含有此意,所以翻译时应增加上去。为了满足意思或修辞上的需要,对于一些英语句子中的名词,在翻译成汉语时可以增加一些适当的形容词,从而使语句更为通顺。
- 例 3: In April, there was the "ping" heard around the world. In July, the ping "ponged".
- 翻译:四月里,全世界听到中国"乒"的一声把球打了出去;到了七月,美国"乓"的一声把球打了回来。(增译背景词语)
- 详解:翻译有时需要根据上下文及背景情况增加词语,比如例3如果直译就是"四

月里全世界听到"乒"的一声;七月里,这"乓"声却"乓"了一下",读者就会不知所云。同样的增译还可以用在中文成语和谚语的翻译上。例如"三个臭皮匠,顶一个诸葛亮。"增译注释性词语,为"Three cobblers with their wits combined equal Zhuge Liang the mastermind."

#### Translation Exercise 1

通过使用移动部件进行电气操作的设备被称为机电设备。严格来说,一个手动 开关就是一种机电组件,但这一术语通常被理解为涉及一个电信号产生机械运动的 设备,或创建一个电信号机械运动。机电这一概念通常指的是涉及电磁继电器等原则,允许电压或电流控制,通常由机械开关的隔离电路电压或使用电流接触和螺线 管,电压可来开动一个移动连接电磁阀。光电传感器也属于机电,但没有使用电磁 原则。电传感器可以从一个电信号创建声音或振动,也可以从声音或机械振动创建 一个电信号。

#### Translation Exercise 2

投标人须在投标分项报价表后单列、报出买方人员出国参加设计联络会、工厂 检验和买方人员在国外接受卖方培训的人均日均费用。以上三项单列的费用,供买 方在签订合同时参考,不包括在投标总报价中,目的是为方便买方对最终合同价的 组成进行选择和比较,这并不限制买方采用任何一种报价或几种报价组合而签订合 同的权力。