东北大学学位与研究生教育教学研究立项资助项目
研究生教程
MTI口译教程

ENGLISH-CHINESE GRADUATE LIBERAL INTERPRETING FOR SCIENCE AND ENGINEERING MAJORS

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理工科学科通识口译英汉教程

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前　言

本书针对两个问题：通识与口译。

本书于中国高校实行大类招生这一大背景之下编写完成。“大类”与“通识”作为中国当代高等教育的两大关键词出现，有其历史的必然性。这两大热词的出现，体现了中国高等教育学者意识到大类、通识知识在整个高等教育体系中的重要性。值得注意的是，这一点不仅仅体现在本科生教育阶段，理工科研究生英语教育的“大类”与“通识”也是一直以来被忽略的环节。

本书以理工科学科通识口译为着眼点，意在填补当下研究生英语教育中的两大空白：一是学科通识英语；二是口译教学。二者合二为一的表达，即理工科传统英语教学的学科通识知识在译这个技能上的教学空白。当提及语言教学时，听说读写译是五个不可分离的语言技能。然而，中国当下英语教学中却普遍存在“译”的教学的不足与缺失，尤其是口译教学。

然而，口译又何以在研究生英语教学中尤为重要呢？

其重要性在于口译教学可以作为“魔法棒”打破中国英语传统教学中“哑巴英语”这个魔咒。自中国开展英语教育以来，中国人学英语，尤其是非英语专业的研究生学英语，耗时久，效果差。究其原因，有文化的原因，但也有教学中口译环节缺失所带来的问题。

本书的编撰意在为理工科研究生英语口译教学提供教科书，更是理工科研究生夯实其学科、学术英语的有益之书。同时，对于 MTI 口译方向的研究生，也可作为其提高学科口译能力的练习之书。本书选取了理工科基础且热门的 16 个专题：数学，医学，农学，物理学，电子信息工程，机械工程，自动化技术，人工智能，计算机科学，土木工程，化学，生物信息，新能源，流行病学，整容和建筑学。各专题包括：学科介绍，词汇，对话口译，段落口译，短篇口译和词汇拓展六个部分。这六个部分归于两类内容：学科与口译。具体来说，一是学科知识与词汇积累；二是口译练习，涵盖从对话、段落到短篇各篇章形式。学科知识主要来自于学科介绍部分，即中英文表述各一个，意在从中文和英文两个方面增进学习者相关学科知识的输入。口译篇章形式齐备，可供教师与学习者用作口译教与学各种技能及口译形式的练习之用。

任　蕊

2016 年 6 月 26 日于澳门路

目 录

第1单元 数学 Mathematics

1.1 学科介绍 Disciplinary Introduction

Part A

数学来源于人类的社会实践，比如工农业生产、商业活动、军事行动和科学技术研究。反过来，数学服务于实践，并在各个领域起着非常重要的作用。没有数学的应用，任何现代科技的分支都不能正常发展。

最初，人类的需要产生了数和形的概念。接着，测量土地问题产生了几何学，测量问题产生了三角学。为了处理更复杂的实际问题，人类建立和解决了带未知数的方程，从而产生了代数学。17 世纪前，人类局限于只考虑常数的初等数学，即几何学、三角学和代数学。17 世纪工业的快速发展推动了经济技术的进步，从而遇到需要处理变量的问题。从常量到变量的跃变产生了两个新的数学分支——解析几何和微积分，它们都属于高等数学。

目前高等数学有很多分支，其中包括数学分析、高等代数、微分方程和函数论等。现在，由于电子计算机的迅速发展和广泛使用，计算机的地位越来越重要。现在计算机不仅用于处理大量的信息和数据，还可以完成一些之前只能由逻辑推理来做的工作，例如，证明大多数的几何定理。

Part B

Mathematics comes from man's social practice, for example, industrial and agricultural production, commercial activities, military operations and scientific and technological researches. And in turn, mathematics serves the practice and plays a great role in all fields. No modern scientific and technological branches could be regularly developed without the application of mathematics.

From the early need of man came the concepts of numbers and forms. Then, geometry developed out of problems of measuring land, and trigonometry came from problems of surveying. To deal with some more complex practical problems, man established and then solved equation with unknown numbers, thus algebra occurred. Before 17th century, man confined himself to the elementary mathematics, i. e., geometry, trigonometry and algebra, in which

only the constants are considered. The rapid development of industry in 17th century promoted the progress of economics and technology and required dealing with variable quantities. The leap from constants to variable quantities brought about two new branches of mathematics-analytic geometry and calculus, which belong to the higher mathematics.

Now there are many branches in higher mathematics, among which are mathematical analysis, higher algebra, differential equations, function theory and so on. Now, since electronic computers are developed promptly and used widely, the role of computation becomes more and more important. In our times, computation is not only used to deal with a lot of information and data, but also to carry out some work that merely could be done earlier by logical deductions, for example, the proof of most of geometrical theorems.

1.2 词汇 Words & Expressions

algebra	*n.* 代数学
geometrical	*adj.* 几何的
algebraic	*adj.* 代数的
identity	*n.* 恒等式
arithmetic	*n.* 算术 *adj.* 算术的
measure	*n.* 测量，测度
axiom	*n.* 公理
numerical	*adj.* 数值的，数字的
operation	*n.* 运算
constant	*n.* 常数
postulate	*n.* 公设
logical deduction	逻辑推理
proposition	*n.* 命题
division	*n.* 除，除法
subtraction	*n.* 减，减法
formula	*n.* 公式
term	*n.* 项，术语
trigonometry	*n.* 三角学
variable	*n.* 变量

1.3 对话口译 Dialogue Interpreting

老师：今天我们来学习数字。这个数字是多少？

Student：It's one hundred and forty.

老师：对。那它是偶数还是奇数？

Student：Well, a number that can be divided by two is an even number, so it's an even number.

老师：好的，咱们来看下一个数。

Student：This figure is zero point five. It's a decimal number.

老师：你知道怎么把这个小数转化为分数吗？

Student：Yes. The number is one half.

老师：现在从1到10之间挑选两个数，包括小数和分数，然后随意进行加、减、乘、除运算。如果得到的答案是小数，就四舍五入到最接近的整数。

Student：Nine minus six is three. Four multiplied by two equals eight. Zero point three six plus one point seven five equal…

老师：2.11四舍五入到最接近的整数是2。如果你用整数相加要容易些。

Student：I get it. Thank you.

》》译文

Teacher：Today we'll study numbers. What's this number?

学生：是140。

Teacher：Yes. Is it an even number or an odd number?

学生：嗯，一个数若能被2整除就是偶数，所以它是偶数。

Teacher：OK. Let's look at the next one.

学生：这个数是0.5，是一个小数。

Teacher：Do you know how to change the decimal into a fraction?

学生：知道，是1/2。

Teacher：Now pick two numbers between one and ten, including decimal numbers and fractions, then add, subtract, multiply or divide them as you like. If there are decimals in your answer, round them up to the nearest whole number.

学生：9减6等于3。4乘以2等于8 。0.36加1.75等于……

Teacher：Two point one one. Rounding it off to the nearest whole number gives you two. It's easier to add it all up if you use whole numbers.

学生：知道了，谢谢老师。

1.4 段落口译 Paragraph Interpreting

1.4.1 英译汉 Interpreting from English into Chinese

A much better way was suggested by Rene Descartes, who introduced the subject of analytic geometry (also known as Cartesian geometry). Descartes' idea was to represent geometric points by numbers. The procedure for points in a plane is this: Two perpendicular reference lines (called coordinate axes) are chosen, one horizontal (called the "*x*-axis"), the other vertical (the "*y*-axis"). Their point of intersection denoted by *O*, is called the origin. On the *x*-axis a convenient point is chosen to the right of *O* and its distance from *O* is called the unit distance. Vertical distances along the *Y*-axis are usually measured with the same unit distance, although sometimes it is convenient to use a different scale on the *y*-axis. Now each point in the plane (sometimes called the *xy*-plane) is assigned a pair of numbers, called its coordinates. These numbers tell us how to locate the points.

》》译文

R. 笛卡儿提出了一个比较好的方法，并建立了解析几何（也称为笛卡儿几何）这个学科。笛卡儿的思想就是用数来表示几何点，在平面上找点的过程如下：选两条互相垂直的参考线（称为坐标轴），一条水平（称为 *x* 轴），另一条竖直（称为 *y* 轴）。它们的交点记为 *O*，称为原点。在 *x* 轴上，原点的右侧选择一个合适的点，该点与原点之间的距离称为单位长度，沿着 *y* 轴的垂直距离通常用同样的单位长度来测量，虽然有时候采用不同的尺度比较方便。现在平面（有时称为 *xy* 平面）上的每一个点都分配了一对数，称为坐标。这些数告诉我们如何定义一个点。

1.4.2 汉译英 Interpreting from Chinese into English

三角形最重要的应用之一是解三角形，现在我们来解直角三角形。一个三角形由 6 个部分组成，三条边和三只角。解一个三角形就是要求出未知的部分。如果三角形的三个部分（其中至少有一个为边）为已知，则此三角形就可以解出。直角三角形的一个角总是已知的，即直角。因此，如果它的两边，或一边和一锐角为已知，则此直角三角形可解。

》》译文

One of the most important applications of trigonometry is the solution of triangles. Let us now take up the solution to right triangles. A triangle is composed of six parts three sides and three angles. To solve a triangle is to find the parts not given. A triangle may be solved if three parts (at least one of these is a side) are given. A right triangle has one angle, the right an-

gle, always given. Thus a right triangle can be solved when two sides, or one side and an acute angle, are given.

1.5 短篇口译 Passage Interpreting

1.5.1 英译汉 Interpreting from English into Chinese

According to the oracle inscription shown on tortoiseshells or animal bones, Chinese people in the Shang Dynasty was already able to use 13 words—one, two, three, four, five, six, seven, eight, nine, ten, hundred, thousand, and ten thousand—to denote any number within 100,000. However, the largest number that can be found is 30,000. The notions of odd, even, and multiple also appeared on the oracle inscriptions.

An example of how the ancient Chinese used the decimal system may be seen in an inscription from the thirteenth century BC, in which "547 days" is written "five hundred plus four decades plus seven of days." The Chinese wrote with characters instead of an alphabet. In the Western alphabet, when writing out numbers greater than nine, new words are used (for example, ten, eleven, and so on). With Chinese characters, ten is ten-blank and eleven is ten-one (zero was left as a blank space: 405 is "four blank five"). This was much easier than inventing a new character for each number. Having a decimal system from the beginning was a big advantage in making mathematical advances. The first evidence of decimals in Europe is in a Spanish manuscript of AD 976.

The decimal system, as a very important invention by the Chinese, boasts great significance in world mathematic history. Joseph Needham (1900—1995), a famous scientific historian who specialized in Chinese sciences, noted that it was virtually impossible for human beings to have a unified world without the decimal system, and the Chinese numeral system in the Shang Dynasty was basically more advanced and scientific than that of contemporary Babylon and Egypt.

》》译文

据甲骨卜辞记载，在商代人们已经学会用一、二、三、四、五、六、七、八、九、十、百、千、万这13个单字记十万以内的任何数字，但是现在能够证实的当时最大的数字是三万。甲骨卜辞中还有奇数、偶数和倍数的概念。

根据公元前13世纪的甲骨文记载，"547天"写作"500天加40天再加7天"，从此例可以看出中国古人是如何使用十进制的。和别的语言不同，汉语用的是文字而不是字母。西方语言在记载大于9的数字时，使用新词（例如10，11等）。汉语中，10为十，11为十一（零留作空位：405为"四百零五"），较西方语言中每个数字以一个单词来对

应而言，这种写法容易得多。中国古人从最初就使用十进制进行运算，就数学发展而言，存在很大优势。而在欧洲，有关十进制的最早记载是在公元 976 年的一份西班牙语手稿中。

十进制是中国人民的一项杰出创造，在世界数学史上有重要意义。著名的英国科学史学家李约瑟教授曾对中国商代记数法予以很高的评价，“如果没有这种十进制，就几乎不可能出现我们现在这个统一化的世界了。”李约瑟说，“总的说来，商代的数字系统比同一时代的古巴比伦和古埃及更为先进、更为科学。”

（选自可可英语）

1.5.2 汉译英 Interpreting from Chinese into English

负数的引进，是中国古代数学家对数学的一个巨大贡献。在《九章算术》的第八章“方程”中，就引入了负数解联立方程组。如负数出现在方程的系数和常数项中，把“卖（收入钱）”作为正，则“买（付出钱）”作为负，把“余钱”作为正，则“不足钱”作为负。在关于粮谷计算的问题中，是以益实（增加粮谷）为正，损失（减少粮谷）为负等。当时是用算筹来进行计算的，以红筹为正，黑筹为负；或将算筹首列作正、斜置作负。

在《九章算术》中，除了引进正负数的概念外，还完整地记载了正负数的运算法则：同号两数相减，等于其绝对值相减；异号两数相减，等于其绝对值相加；零减正数得负数，零减负数得正数。异号两数相加，等于其绝对值相减；同号两数相加，等于其绝对值相加；零加正数得正数，零加负数得负数。直到公元 17 世纪以前，这还是有关正负数加减运算最完整的叙述。

在西方，负数出现得很晚。许多著名数学家一直不承认负数。他们把零看作“没有”，他们不能理解比“没有”还要“少”的现象，因而认为负数是“荒谬的”。直到 17 世纪，笛卡儿创立了坐标系，负数获得了几何解释和实际意义，才逐渐得到了公认。

引进负数，是中国古代数学家贡献给世界数学的一份宝贵财富。负数概念引进后，整数集和有理数集就完整地形成了。

》》译文

The introduction of negative numbers is a great contribution to mathematics by ancient Chinese mathematicians. In *Nine Chapters on the Mathematical Art* (or *Jiuzhang Suanshu*), negative numbers were used in the eighth chapter on solving systems of simultaneous equations. For instance, revenue numbers are considered positive, while expense numbers are deemed negative; or surplus amounts are viewed as positive, while deficit amounts are seen as negative. In a problem calculating grains, the increased grains are considered positive, and the lost grains, negative. At the time, calculation was done by the method of Suan Chou (counting rods) Red rods were used to denote positive coefficients, and black ones to denote negative ones. Or in another case, the normal position of Suan Chou denoted positive, while an inclined position

denoted negative.

Rules for the calculation of signed numbers were also given *in Jiuzhang Suanshu*. According to the book, the deduction (or subtraction) of two numbers with the same sign (from another number) equals the deduction of the absolute values of the two numbers, while the deduction of two numbers with different signs equals the addition of the absolute values of the two numbers. Also a positive number subtracted from zero gives a negative number, whereas a negative number subtracted from zero gives a positive number. The addition of two numbers with different signs equals the deduction of their absolute values, while the addition of two numbers with the same sign equals the addition of their absolute values. Zero plus a positive number is still a positive number, and zero plus a negative number is still a negative number. Until the 17th century, it was the most complete depiction on the rules for adding and subtracting positive and negative numbers in the world.

Negative numbers appeared very late in the West. Many noted mathematicians did not admit negative numbers, because they consider zero as "nothing" and could not understand that something could be even less than "nothing", and so considered negative numbers "absurd". It was only in the 17th century when Descartes invented the coordinate system, which gave a geometrical explanation and an actual meaning for negative numbers, that negative numbers began to be accepted gradually.

The introduction of negative numbers is an important contribution of Chinese mathematicians to world mathematics. With the introduction of negative numbers, the whole numbers and rational numbers became complete.

(选自可可英语)

1.6 词汇拓展 Developing Words and Expressions

numerical	数值的，数的
position	位置，状态
cube	立方体
sphere	球
cylinder	柱体
cone	圆锥
geometrical	几何的
triangle	三角形
surface	面，曲面
pyramid	菱形
add, plus	加

subtract	减
difference	差
multiply, times	乘
product	积
divide	除
divisible	可被整除的
divided evenly	被整除
dividend	被除数
divisor	因子，除数
quotient	商，商数
remainder	余数
factorial	因子的，阶乘的
power	乘方
radical sign, root sign	根号
round to	四舍五入
to the nearest	四舍五入
volume	体积
area	面积
perimeter	周长
length	长
width	宽
height	高
coordinates	坐标
base area	底面积
lateral area	侧面积
surface area	表面积
positive number	正数
negative number	负数
integer	整数
rational number	有理数
irrational number	无理数
linear function	一次函数
quadratic function	二次函数
inverse proportional function	反比例函数
trigonometric function	三角函数
Pythagoras theorem	勾股定理
let x be…	设…为 x

the surface area of a sphere $= 4\pi r^2$ 球体的表面积 $= 4\pi r^2$

the volume of a sphere $= (4/3)\ \pi r^3$ 球体的体积 $= (4/3)\ \pi r^3$

$A \cap B$ means the intersection of A and B A 交 B 的意思是 A 和 B 的交集

$(A \cap B)'$ means the complement of the intersection of A and B, which is equal to $A' \cup B'$, the union of the complement of A and the complement of B

A 交 B 的意思是 A 和 B 的交集的补集，等于 A' 并 B'，A 的补集和 B 的补集的并集