《有限元方法的数学理论》

图书基本信息

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前言

Mathematics is playing an ever more important role in the physical and biological sciences, provoking a blurring of boundaries between scientific disciplines and a resurgence of interest in the modern as well as the clas-sical techniques of applied mathematics. This renewal of interest, both inresearch and teaching, has led to the establishment of the series Texts in Applied Mathematics （TAM）. The development of new courses is a natural consequence of a high level of excitement on the research frontier as newer techniques, such asnumerical and symbolic computer systems, dynamical systems, and chaos, mix with and reinforce the traditional methods of applied mathematics.Thus, the purpose of this textbook series is to meet the current and future needs of these advances and to encourage the teaching of new courses. TAM will publish textbooks suitable for use in advanced undergraduateand beginning graduate courses, and will complement the Applied Mathe-matical Sciences （AMS） series, which will focus on advanced textbooks andresearch-level monographs.

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内容概要

《有限元方法的数学理论(第3版)》内容简介：This edition contains four new sections on the following topics: the BDDC domain decomposition preconditioner (Section 7.8), a convergent adaptive algorithm (Section 9.5), interior penalty methods (Section 10.5) and Poincare-Friedrichs inequalities for piecewise Wp1 functions (Section 10.6).We have made improvements throughout the text, many of which were suggested by colleagues, to whom we are grateful. New exercises have been added and the list of references has also been expanded and updated.

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书籍目录

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章节摘录

We will take this opportunity to philosophize about some power-ful characteristics of the finite element formalism for generating discreteschemes for approximating the solutions to differential equations. Being based on the variational formulation of boundary value problems， it is quite systematic， handling different boundary conditions with ease； one simply re-places infinite dimensional spaces with finite dimensional subspaces. What results， as in （0.5.3）， is the same as a finite difference equation， in keeping with the dictum that different numerical methods are usually more similarthan they are distinct. However， we were able to derive very quickly the convergence properties of the finite element method. Finally， the notation for the discrete scheme is quite compact in the finite element for mulation.This could be utilized to make coding the algorithm much more efficient if only the appropriate computer language and compiler were available. Thislatter characteristic of the finite element method is one that has not yet been exploited extensively， but an initial attempt has been made in the sys-tem fec （Bagheri， Scott & Zhang 1992）. （One could also argue that finiteele ment practitioners have already taken advantage of this by developingtheir own "languages" through extensive software libraries of their own， but this applies equally well to the finite-difference practitioners.） ......

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精彩短评

1、鄙人数学功底不行，看着费力气，不过也没打算一次看懂，慢慢看吧；
要有很好的数学功底哦，工科学生注意了。
这方面的书本来就少，所以打了5星，嗯，褒奖加鼓励吧，受用不敢说。
2、今天刚拿到书，别人推荐买的，经典教材，不过纸张质量没有想象中的好。
3、经典，不错，理论基础
4、大概翻了一下，是影印版的，没有想象中的那么好，总体还不错
5、理论性很强，适合作研究的人员阅读。
6、导师推荐的，应该是不错的教材
7、本书质量非常好，读起来朗朗上口，像小说一样，建议来本英译版
8、内容全面，由浅入深，写的非常好，作者是有限元方面的著名专家
9、书的内容自然是没话说 只是影印版还卖这贵 难以理解
还有这发票是迷你型的
10、内容详尽，利于学习
11、这是我的第一本英文版从数学理论上研究有限元的书，用于学习专业英语还是很好的。
12、有限元经典教材。
13、研读像这样理论性强的书就像趟浑水，一陷进去就需要花大量时间，不适合我这种需要即学即用的人。
14、还没仔细看，大致不错
15、是计算数学专业的必备书
16、书不错，送的也挺及时。贵！

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章节试读

1、《有限元方法的数学理论》的笔记-第76页

\begin{equation}
u \frac {\partial u}{\partial x} \frac {\partial u}{\partial y} \frac {\partial ^2 u}{\partial x^2} \frac {\partial ^2 u}{\partial y^2} \frac {\partial ^2 u}{\partial x \partial y}
\end{equation}

2、《有限元方法的数学理论》的笔记-第82页

P82中Fig .3.14.最右边的那个图好像有点问题，在三角形的底边上还有一个点，请各位指教。

3、《有限元方法的数学理论》的笔记-第76页

Fig. 3.9. quintic Argyris triangle（五次Argyris三角形有限元）

感觉这个图画的有点问题，每个顶点提供六个信息（($ u \frac {\partial u}{\partial x} \frac {\partial u}{\partial y} \frac {\partial ^2 u}{\partial x^2} \frac {\partial ^2 u}{\partial y^2} \frac {\partial ^2 u}{\partial x \partial y} $)），而中间节点处只需提供方向到数值，就能达到总数为21的条件约束，而Fig 3.9 中给出了 (m_3) 处点的函数值，这个感觉不需要吧？

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