系統編號:	092NCKU5507008
出版年:	
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全文資料 :	電子全文下載
論文名稱:	緊緻性及其應用
英文論文名稱:	Compactness and its applications
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系所名稱:	數學系應用數學碩博士班
學年度:	92
語文別:	英文
論文頁數:	39
關鍵詞:	緊緻性
英文關鍵詞:	compact
被引用次數:	0

[摘要]

none

[英文摘要]

In this article, we use the concept of "Cantor' s diagonal process" to prove the compactness of the theorems. First we review the Bolzano-Weierstrass Theorem in R. But the compactness of R-closed and bounded is not true for infinite dimensional space and we will give an example. In section 2, we will also use the concept of
"Cantor' s diagonal process" to show the compactness of the general metric space is equivalent to complete and totally bounded. In section 3, we use the same method to prove Arzela-Ascoli Theorem. Then, in section 4-7, we apply the compactness of the general metric space and Arzela-Ascoli Theorem to present various conditions of compactness to Lp spaces, Sobolev spaces W1;p(), and Aubin compactness theorem. Finally, in section 8, we will give two examples of integral operator as a compact operator.

[論文目次]

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