DEPARTMENT OF MATHEMATICS

PURE MATHEMATICS 211-23

ANALYSIS IN METRIC SPACES

IN REPLY PLEASE QUOTE
REF.

TELEPHONE: ARMIDALE 72 2911
AREA CODE 067
TELEX NUMBER 66050
POST CODE 2351

EX SAPIENTIA MODUS

THE UNIVERSITY OF NEW ENGLAND
ARMIDALE, N.S.W.

DEPARTMENT OF MATHEMATICS
3rd January, 1979

Dear Pure Maths 211-23 student,

The course "Analysis in Metric Spaces" introduces you to an important branch of modern mathematics, with applications in other areas of mathematics and many of the physical sciences. Because it is an 'abstract' study you may not find it easy at first, however, if you master the various definitions, concepts and results underlying the subject you will find it a rewarding exercise in logical axiomatic thinking and will have equipped yourself with a fundamental and representative piece of twentieth century mathematical analysis.

The following notes are not a complete set for the course but rather a comprehensive summary. Before grasping much of the course material you will find it necessary to refer to at least one of the references listed at the end of each lecture (in particular: Giles "Analysis of Metric Spaces", Lecture Notes on Mathematics No. 1, University of Newcastle) as well as working some of the problems.

Some exercises occur at strategic points in the lectures, others are collected together as problems at the conclusion of each lecture. It is important that you attempt as many of these as possible (and learn from them). Don't leave them till the finish of the course, they are an integral part of it and should be worked as the course progresses.

The appropriate material from each "lecture" in these notes would, on the average, be covered in two one-hour lectures with internal students, and so each lecture corresponds to roughly one week's work.

The notes, appendices and supplements at the end of some lectures do not form a compulsory part of the course, but add purpose and completeness to it. As a general rule, lecture material enclosed in [...] is not examinable but may prove helpful later in the course.

The course details are as follows:

plus at least one of the two appendices to lecture 7 (pages 49-55), the choice of which is yours.

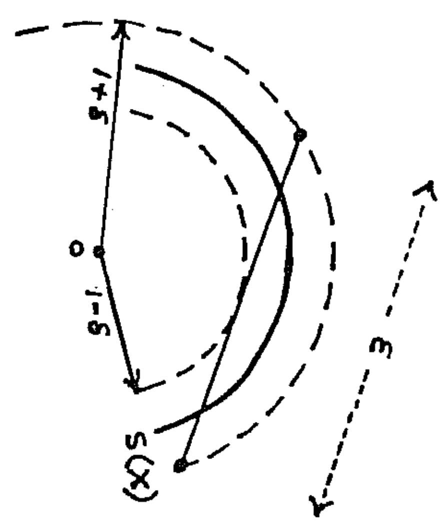
Solutions to most of the exercises heve been prepared by Dr. G.A. Joseph and are included at the end of the notes. Make sure you use these solutions productively, being able to understand a solution as you read it means nothing. After having made use of a solution you should test yourself several days later to make sure you can now understand and do the question without any reference to the solution provided.

Wishing you success and enjoyment in your studies.

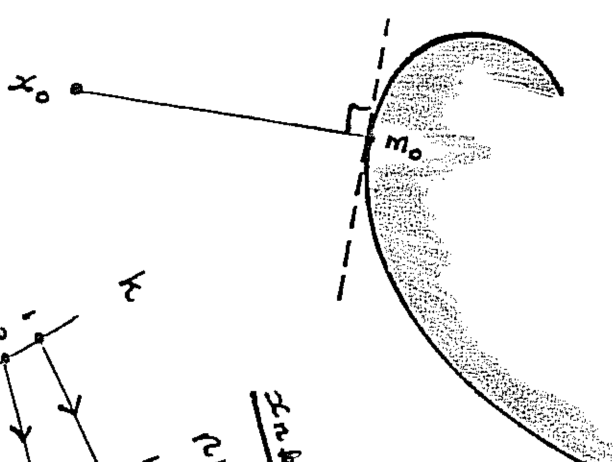
Brailey Sims.

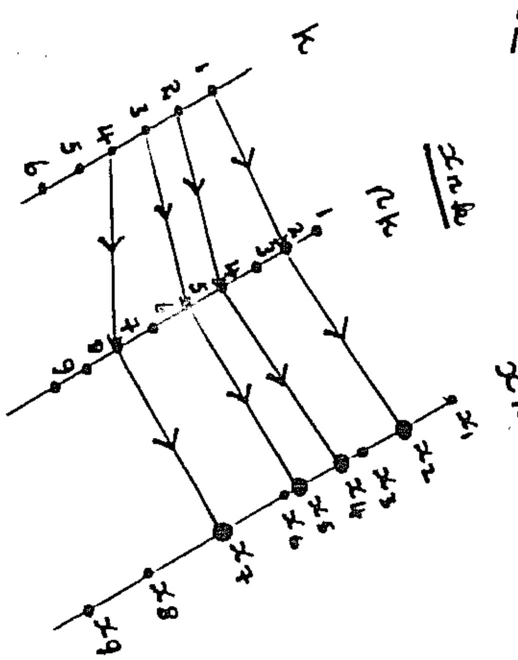
DEPARTMENT OF MATHEMATICS

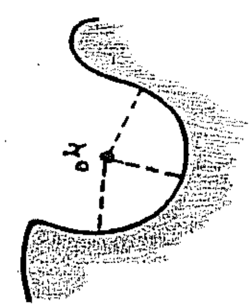
PURE MATHEMATICS 211.23



APPROXIMATION THEORY







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EX SAPIENTIA MODUS

THE UNIVERSITY OF NEW ENGLAND

ARMIDALE, N.S.W.

DEPARTMENT OF MATHEMATICS
1st January, 1978

Dear Pure Maths 211 Approximation Theory Student,

From the pioneering work of Pafnuti Tchebycheff and Karl Weierstrass through the penetrating work of Haar, Bernstein and many others to the present day, approximation theory has become an increasingly important branch of mathematics with applications in other areas of mathematics, computing, engineering, economics and the social and life sciences.

The most suitable framework for the development of approximation theory has proved to be that of *functional analysis* and a basic goal of this course is to introduce the theory of normed linear spaces. However the course is too short to permit more than an introduction to the subject, the more specific and usually more involved problems (see Cheney, Ch. 3 onwards) have been avoided.

Although there is some common material between the option "analysis in metric spaces" and sections 1 and 2 of the current course, no familiarity with metric spaces is assumed and the approach adopted and emphasis given to this common material is quite different in the two courses.

The relative time you should spend on each section can best be gauged from the following "lecture" schedule.

Week	Lecture	
1	1	§0, §1 to middle of p.3
	2	rest of §1; §2 to bottom of p.5
2	3	rest of §2
	4	§3
3	5	§4 to the end of Theorem 1
	6	§4 continued to start of Theorem 2
4	7	rest of §4
	8	§5 to bottom of p.16
5	9	rest of §5
	10	§6 to top of p.23
6	11	rest of §6; 1st page of §7
	12	§7 to the definition on p.26
7	13	rest of §7
	14	(free)