

PREFACE

In universities and colleges it has become customary to give two algebra courses, the first being called abstract algebra and the second linear algebra. The present volume, Lectures on Algebra I, is meant as a text-book for an abstract algebra course, while the forthcoming sequel, Lectures on Algebra II, should serve as a text-book for a linear algebra course. The author's fondness for algebraic geometry shows up in both volumes, and his recent preoccupation with the application of group theory to the calculation of Galois groups is evident in the second volume which contains more local rings and more algebraic geometry. Both volumes are based on the author's lectures at Purdue University during the last several years. An attempt has been made to make these volumes self-contained. The reader may prefer to start with the sixth lecture which gives a rapid summary of the first five lectures. He may also find it helpful to look at the detailed contents printed at the end of the volume just before the index; this is particularly significant for the enormous (about 300 pages) Section §5 of Lecture L5.

When in a certain lecture we are referring to an item from another lecture, the citation of the other lecture precedes the citation of the item. Thus, for instance, in the proof of Theorem (Q4)(T13) in Lecture L5, the reference L4§5(O11) is to Observation (O11) of §5 of Lecture L4, whereas the reference (T11) is to Theorem (T11) of Lecture L5.

Frequently, assertions made in one place are proved or expanded later on. For this purpose, forward reference is indicated by [cf.]. For instance, on page 4, at the end of the sentence "This is unique up to isomorphism, i.e., between two copies of it there is a one-to-one onto map preserving sums and products;" the phrase "[cf. L5§5(Q32)(T138.2)]" means that the proof of the preceding claim that there is a unique field $\text{GF}(q)$ of q elements, will be given in Theorem (T138.2) of Quest (Q32) of Section §5 of Lecture L5.

Like a Russian Petrushka doll, there are many books within this book. For instance, the first three lectures, L1, L2, L3 constitute a booklet on a basic abstract algebra course. The sixth lecture L6 by itself constitutes another such course. These two alternatives together make up a larger such booklet. The fourth lecture L4 is a booklet on commutative algebra. It is continued in the fifth lecture L5 which may be

viewed as a treatise on commutative algebra. Within it, Quest (Q31) is a pamphlet on Suslin's work on projective modules and special linear groups over multivariable polynomial rings. Finally, Sections §§2-5 of L3, §§8-9 of L4, and Quests (Q33)-(Q35) of L5§5 form a short course on algebraic geometry.

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