## Contents

| Chap       | ter 1. Torsion theory                           |     |
|------------|---|-----|
| 1.         | Preradicals                                     | 1   |
| 2.         | Torsion theories                                | 4   |
| 3.         | Topologies                                      | 12  |
| 4.         | Stable torsion theories                         | 20  |
| 5.         | Topologies for a commutative noetherian ring    | 23  |
| 6.         | $\underline{F}$ -injective modules              | 29  |
| Chap       | ter 2. Categories of modules of quotients       |     |
| 7.         | Construction of rings and modules of quotients  | 33  |
| 8.         | Modules of quotients and F-injective envelopes  | 41  |
| 9.         | Coreflective subcategories of Mod-A             | 44  |
| 10.        | Giraud subcategories and the Popescu-Gabriel    |     |
|            | theorem   | 48  |
| Chap       | ter 3. General properties of rings of quotients |     |
| 11.        | Lattices of F-pure submodules                   | 58  |
| 12.        | Finiteness conditions on topologies             | 68  |
| 13.        | Flat epimorphisms of rings                      | 72  |
| 14.        | Maximal flat epimorphic extension of a ring     | 82  |
| 15.        | 1-topologies and rings of fractions             | 86  |
| Chap       | ter 4. Self-injective rings                     |     |
| 16.        | The endomorphism ring of an injective module    | 93  |
| 17.        | Coperfect rings                                 | 97  |
| 18.        | Quasi-Frobenius rings                           | 101 |
| Chap       | ter 5. Maximal and classical rings of quotients |     |
| 19.        | The maximal ring of quotients                   | 110 |
| 20.        | The maximal ring of quotients of a non-singular |     |
|            | ring  | 113 |
| 21.        | The maximal ring of quotients of a reduced ring | 118 |
| 22.        | The classical ring of quotients                 | 123 |
| References |   | 130 |