CONTENTS

Introduction 1

Part I: General theory

§0. Preamble: definitions, change of universe, and split G-spectra 14

§1. Invariance properties of the functors f, c, and t 20

§2. Basic properties of the theories represented by $f(k_G)$, $c(k_G)$, and $t(k_G)$ 23

§3. Homotopical behavior of the functors f, c, and t 26

§4. Completion at the augmentation ideal of the Burnside ring 30

§5. Transfer and the fixed point spectra of Tate G-spectra 37

Part II: Eilenberg-Maclane G-spectra and the spectral sequences

§6. Eilenberg-MacLane G-spectra and their associated theories 43

§7. Mackey functors and coefficient systems 48

§8. Products in the theories associated to Eilenberg-MacLane G-spectra 52

§9. Chain level calculation of the coefficient groups 55

§10. The f, c, and t Tate Atiyah-Hirzebruch spectral sequences 61

Part III: Specializations and calculations

§11. Tate-Swan cohomology and the spectral sequences for finite groups 68

§12. Some remarks on nonequivariant stable homotopy theory 74

§13. The Tate K-theory of finite groups and related calculations 78

§14. Cyclic cohomology and the spectral sequences for the circle group 83

§15. Calculations in homotopy and K-theory for the circle group 90

§16. Free G-spheres and periodicity phenomena 94

Part IV: The generalization to families

§17. Families and their f, c, and t G-spectra 98

§18. Cohomological and homological completion phenomena 104

§19. The generalized Tate G-spectra of periodic K-theory 107

§20. Theories associated to Mackey functors and coMackey functors 113

§21. Amitsur-Dress-Tate cohomology theories 119

§22. The generalized Tate Atiyah-Hirzebruch spectral sequences 124

§23. Some calculational methods and examples: groups of order pq 129

§24. Equivariant root invariants of stable homotopy groups of spheres 135

§25. Proof of the root invariant theorem 142

Appendix A: Splittings of rational G-spectra for finite groups G 146

Appendix B: Generalized Atiyah-Hirzebruch spectral sequences 154

Bibliography 164

Index 168