

TABLE OF CONTENTS

Chapter 1: Introduction to bilinear forms

| | |
|---|----|
| 1. Finitely generated projective modules | 1 |
| 2. Local structure of projective modules | 4 |
| 3. Bilinear forms | 9 |
| 4. Hyperbolic spaces and metabolic spaces | 14 |
| 5. The Witt ring | 17 |

Chapter 2: Bilinear forms over semi-local rings

| | |
|--|----|
| 1. Semi-local rings | 24 |
| 2. Diagonalization | 27 |
| 3. Connecting orthogonal bases | 34 |
| 4. Generators and relations for $W_f(A)$ | 38 |
| 5. Inductive description of isometry | 40 |
| 6. Witt cancellation; value sets | 45 |
| 7. Properties of Pfister forms | 50 |

Chapter 3: Prime ideals and signatures on Witt rings

| | |
|--|----|
| 1. Elementary properties of complexes | 56 |
| 2. Dress's local-global lemma | 59 |
| 3. The prime ideal theorem and other applications . . | 66 |
| 4. Prime ideals and the nilradical of $W_f(A)$ | 69 |
| 5. Pfister's local-global principle | 75 |
| 6. The total signature | 79 |
| 7. The reduced theory over semi-local rings | 84 |

Chapter 4: Introduction to the real spectrum

| | |
|---|-----|
| 1. Orderings and preorderings | 95 |
| 2. Maximal orderings | 100 |

| | |
|--|-----|
| 3. The real spectrum | 104 |
| 4. relationship to real varieties | 111 |
| 5. Abstract "Stellensatze" | 119 |
| 6. Rings of continuous sections | 125 |
| 7. Stone-Weierstrass approximation | 134 |

Chapter 5: Orderings and signatures related

| | |
|--|-----|
| 1. The map $X_A \rightarrow \tilde{X}_A$ | 141 |
| 2. Connected components of X_A | 147 |
| 3. Behaviour of bilinear forms under $A \rightarrow A_\Sigma$ | 153 |
| 4. Transfer maps | 156 |
| 5. Behaviour of bilinear forms under $A \rightarrow \Gamma^\infty$ | 160 |
| 6. Bilinear forms over Γ^∞ | 167 |