

TABLE OF CONTENTS

	<u>Page</u>
Abstract	ii
Acknowledgment	iii
I. Introduction	1
1.1 General	1
1.2 The Woon Algorithm	2
1.3 Quadraw	6
II. The Quadratic Form	9
2.1 Transformations of the Discriminant	10
2.2 Canonical Form	12
2.3 The Discriminant Form for Conic Sections	15
2.4 Classification of Quadric Surfaces and Conic Sections	16
III. Classification of Quadric Surface Intersections	20
3.1 The Pencil of Two Quadric Surfaces	20
3.2 Classification of Pencils	21
3.3 Determining Whether a Surface Intersection is Planar or Singular	21
3.4 Non-singular Pencils	22
IV. Theory of Parameterization	23
4.1 Parabola	23
4.2 Ellipse	23
4.3 Hyperbola	24
4.4 More Complete Forms	24
4.5 Non-planar Intersections	25
V. Data Needed by the Algorithm	26

	<u>Page</u>
VI. Classifying Surface Intersections	28
VII. Planar Intersections	31
7.1 Finding and Classifying Intersections	31
7.2 Parameterization	32
7.3 Finding Parameter Limits	33
VIII. Non-Planar QSICS	37
8.1 Basic Techniques	37
8.2 Cylindric Intersections	39
8.3 OSICs Lying in Hyperbolic Paraboloids	40
IX. Parameter Limits and QSIC Tracing	42
9.1 Basic Parameter Limits	42
9.2 Tracing the Edge to Find Bounded Parameter Limits	43
X. Limbs	44
10.1 Defining Limbs	44
10.2 Orthographic Projections	44
10.3 Perspective Projections	45
10.4 Point Orientation	46
XI. Hidden-Line Determination and Picture Drawing	47
11.1 Preliminary Processing	47
11.2 Tracing an Edge	48
The "tight" scan	49
The "loose" scan	49
11.3 Vector Length	50
XII. Conclusion	52
References	53
Appendix	