Algebraic Sets In Geometric Algebra

Spencer T. Parkin

To my dear wife Melinda.

Abstract. Abstract...

Keywords. Key words...

1. Introduction

2. The Intersection Of Two Circles In The Plane

In this section we solve the same problem twice; once with the conformal model, and another using a more general model.

2.1. Using The Conformal Model

2.2. Using A More General Model

Let $\mathbb{F}$ denote an algebraicly closed field, and $\mathbb{V}^2(\mathbb{F})$ a 2-dimensional, euclidean vector-space with scalars taken from $\mathbb{F}$. Letting s_x, s_y be a pair of orthonormal vectors taken from $\mathbb{F}^2$, and therefore a basis generating $\mathbb{V}^2(\mathbb{F})$, we will define, for all $v \in \mathbb{V}^2(\mathbb{F})$, the notation $v_x = v \cdot s_x$ and $v_y = v \cdot s_y$. We now let $\mathbb{V}^6(\mathbb{F})$ denote a 6-dimensional, euclidean vector space generated by the set of orthonormal basis vectors

$$\{e, e_x, e_y, e_{xy}, e_{xx}, e_{yy}\},$$

and we define the mapping $p : \mathbb{V}^2(\mathbb{F}) \to \mathbb{V}^6(\mathbb{F})$ as

$$p(v) = e + v_x e_x + v_y e_y + v_x v_y e_{xy} + v_x^2 e_{xx} + v_y^2 e_{yy}.$$

For convenience, we'll set $s_x = e_x$ and $s_y = e_y$ so that $\mathbb{V}^2(\mathbb{F})$ is a sub-space of $\mathbb{V}^6(\mathbb{F})$. Doing so, equation (**??**) becomes

$$p(v) = e + v + v_x v_y e_{xy} + v_x^2 e_{xx} + v_y^2 e_{yy}.$$

References

Spencer T. Parkin
e-mail: spencerparkin@outlook.com