CLIFFORD MATRICES, CAUCHY KOWALEWSKI EXTENSIONS AND ANALYTIC FUNCTIONALS

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INTRODUCTION

Our aim is to first use classical, and Clifford, analysis to characterize the dual space of the space of analytic functions on the unit sphere in R^{n+1} . Our characterization is given by an infinite set of vector spaces of functions defined on the complement of the sphere. Each space comprises of solutions to a fixed order iterate of the Euclidean Dirac operator. The first of these representation spaces has previously been obtained by Sommen [13].

We then examine the Cauchy-Kowalewski extensions of the analytic functions on the unit sphere in more detail. We use Huygens principle to show that these extensions are determined by the holomorphic extensions of these functions within the complex sphere. This enables us to give a characterization of the space of analytic functionals over the unit sphere, as the completion of a union of subspaces of holomorphic functionals acting over a system of domains of holomorphy lying the complex sphere, and containing the sphere. These domains of holomorphy correspond to ones described by Morimoto in [8].

CLIFFORD ANALYSIS REVISITED

In this section we give, for completeness, a reintroduction to some basic results from Clifford analysis that we require here.