

Codomains for the Cauchy-Riemann and Laplace operators in \mathbb{R}^2

Lloyd Edgar S. Moyo

(Communicated by Hans Triebel)

2000 Mathematics Subject Classification. 46F05, 46F10, 46F12.

Keywords and phrases. \mathcal{S}' -convolution, weighted integrable distribution spaces, fundamental solution, Cauchy-Riemann operator, Laplace operator.

Abstract. A codomain for a nonzero constant-coefficient linear partial differential operator $P(\partial)$ with fundamental solution E is a space of distributions T for which it is possible to define the convolution $E * T$ and thus solving the equation $P(\partial)S = T$. We identify codomains for the Cauchy-Riemann operator in \mathbb{R}^2 and Laplace operator in \mathbb{R}^2 . The convolution is understood in the sense of the \mathcal{S}' -convolution.

1. Introduction

Let $\mathbb{N}_0 = \{0, 1, 2, 3, \dots\}$. Consider a nonzero polynomial

$$P(x) = \sum_{|\alpha| \leq m} a_\alpha x^\alpha,$$