BRICEYDA DELGADO, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional
Hilbert Transform associated to the main Vekua equation

We will recall some results from article $[1]$, where an explicit representation to the Hilbert transform $\mathcal{H}$ was given on the unit sphere in $\mathbb{R}^n$. The Hilbert transform takes data on the boundary and completes them to obtain the boundary value of a monogenic (hyper-holomorphic) function. These results will be reduced to the case $n = 3$ with $\Omega = B^3$ and $\partial\Omega = S^2$.

Then, we will give a definition for the Hilbert transform $\mathcal{H}_f$ associated to the main Vekua equation $DW = \frac{Df}{f}\overline{W}$. Furthermore, some results about $\mathcal{H}_f$ will be enunciated such as the continuity, invertibility and uniqueness.

After that an extension in Ω will be given for the vectorial part of the solutions of the main Vekua equation, when the boundary value of the scalar part is known. That vectorial extension in terms of $\mathcal{H}_f$ will be compared with the vectorial extension derivated of the general solution of the Div-Curl system corresponding to the main Vekua equation given in [2].

[1] Tao Qian and Yan Yang. Hilbert Transform on the Sphere with the Clifford Algebra Setting, Journal of Fourier Analysis and Applications, (2009), $753 - 774$.

[2] Briceyda B. Delgado and R. Michael Porter. General Solution of the Inhomogeneous Div-Curl System and Consequences, 2017 (in preparation).