AN OVERVIEW ON THE HARDY SPACES - PART II

FLAVIA COLONNA

For $0 < p < \infty$, the Hardy space H^p is the set of analytic functions f on the open unit disk $\mathbb{D}$ such that

$$\|h\|_{H^p}^p := \sup_{0<r<1} \int_0^{2\pi} |f(re^{i\theta})|^p \, d\theta < \infty.$$

The Hardy space H^∞ is defined as the class of bounded analytic functions on $\mathbb{D}$ equipped with the supremum norm.

We shall discuss the existence of radial (as well as non-tangential) limits of functions in H^p by connecting such functions to the corresponding functions on the unit circle that arise from the Fourier series associated with the Taylor series at the boundary.

From the Lebesgue and the Jordan decomposition of Baire measures on the circle, we shall derive the canonical factorization of functions in H^p into inner and outer functions.

References

[1] P. Duren, *Theory of H^p spaces*, Pure and Applied Mathematics **38**, Academic Press, New York, 1970.

[2] K. Hoffman, *Banach Spaces of Analytic Functions*, Dover Pub. New York, 2007.