

REPRESENTATION OF HARMONIC FUNCTIONS WITH POINT SINGULARITY

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Abstract. A classical result on the representation of harmonic functions with singularity in \mathbb{R}^n is proved using the distributions instead of the series expansion of a harmonic function.

1. Introduction

M. BreLOT (pp. 189-202 in [1]) has described the behaviour of harmonic function in the neighborhood of a point singularity in \mathbb{R}^n , $n \geq 2$. For that study, he makes an extensive use of the Laurent-type series expansion of harmonic function around the singular point.

We point out in this note, how these results could be obtained using the theory of distributions instead of the series expansion. This method is elegant and allows a unified version of the results unlike in the series expansion where the case \mathbb{R}^2 has to be treated a little differently from the case \mathbb{R}^n , $n \geq 3$.

If Δ is the Laplacian operator, the fundamental solution F_n in \mathbb{R}^n , $n \geq 1$, is

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