

MULTIFRACTAL ANALYSIS OF HEWITT–STROMBERG MEASURES WITH RESPECT TO GAUGE CONTROL FUNCTIONS

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ABSTRACT. This study provides a general multifractal formalism that overcomes the limitations of the traditional one. The generic Hewitt–Stromberg measures are used to introduce and study a multifractal formalism. The generic Hewitt–Stromberg dimensions' upper and lower bounds are estimated, producing results even at places q where the upper and lower multifractal Hewitt–Stromberg dimension functions diverge.

1. Introduction

The publications [5], [25], [27], [40], [51], [54], [56] are the primary inspiration for this paper, where the following question is considered: what can be said about the case where the classical multifractal formalism does not hold? There are natural measure theoretical analogues of fractal sets, namely, distributions with widely varying intensities. Such distributions are called multifractal measures and have undergone extensive research over the past 30 years. Due to the important role, the multifractal analysis/formalism of measures plays in fractal geometry and dynamical systems, it is natural and of considerable interest to develop it. The term “multifractal” was introduced in [18] as part of the statistical

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