

Title: Multifractal tube formulas

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Abstract

A stadium has perimeter P and area A , and is surrounded by a running track of width r .

Here is a small problem: Find a formula for the area of the running stadium including the running track involving only P , A and r .

This formula is an example of a tube formula.

More precisely, “tube formulas” are by definition formulas for the n -dimensional volume of the r neighborhood an n -dimensional set K , say. If K is convex, then tube formulas have been studied since the 1840's by, for example, the great geometer Jakob Steiner: <http://www-history.mcs.st-andrews.ac.uk/history/Biographies/Steiner.html>

More recently, during the past 15 years Lapidus has pioneered the study of tube formulas for fractal sets K .

In the 2 talks I will attempt to develop a “tube formula theory” for multifractal measures.

This will involve: probability theory, renewal theory, geometric measure theory, complex analysis (the Residue Theorem) and zeta-functions.