

BOX APPROXIMATION AND RELATED TECHNIQUES
IN SPECTRAL THEORY

Vita Borovyk

Dr. Konstantin Makarov, Dissertation Supervisor

ABSTRACT

This dissertation is concerned with various aspects of the spectral theory of differential and pseudodifferential operators. It consists of two chapters.

The first chapter presents a study of a family of spectral shift functions ξ^r , each associated with a pair of self-adjoint Schrödinger operators on a finite interval $(0, r)$. Specifically, we investigate the limit behavior of the functions ξ^r when the parameter r approaches infinity. We prove that an ergodic limit of ξ^r coincides with the spectral shift function associated with the singular problem on the semi-infinite interval.

In the second chapter, we study the attractor of the dynamical system $r \mapsto \mathcal{A}_r$, where \mathcal{A}_r is the truncated Wiener-Hopf operator surrounded by operators of multiplication by the function $e^{\frac{\alpha}{2}|\cdot|}$, $\alpha > 0$. We show that in the case when the symbol of the Wiener-Hopf operator is a rational function with two real zeros the dynamical system $r \mapsto \mathcal{A}_r$ possesses a nontrivial attractor of a limit-circle type.