CLOAKING AND EXTENSION THEORY

AMRU HUSSEIN

Light propagation through materials with negativ refraction index, so called meta-materials, can yield to cloaking effects. This setting is discribed in terms of operators $Su(x) = \nabla \cdot A(x)\nabla u(x)$, where

$$A(x) = \begin{cases} +1, & x \in \Omega_+, \\ -1, & x \in \Omega_-, \end{cases}$$

and u is defined on $\Omega = \Omega_- \cup \Omega_+$ (see e.g. Bouchitté and Schweizer, 2010).

Operators of this type can be understood in terms of extension theory. This is carried out in detail for the case of finite metric graphs as underlying space. These serve as a model problem and allow to construct explicitly solvable examples. Self-adjoint realisations and some of their spectral properties are discussed.

A. HUSSEIN, FB 08 - INSTITUT FÜR MATHEMATIK, JOHANNES GUTENBERG-UNIVERSITÄT MAINZ, STAUDINGER WEG 9, D-55099 MAINZ, GERMANY

E-mail address: hussein@mathematik.uni-mainz.de