

Diao, Huaian; Liu, Hongyu; Wang, Xianchao; Yang, Ke

On vanishing and localizing around corners of electromagnetic transmission resonances.

(English) [Zbl 1477.78003](#)

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Summary: We are concerned with the geometric properties of the transmission resonance in electromagnetic scattering. The transmission eigenvalue problem is a type of non-elliptic and non-selfadjoint spectral problem which connects to electromagnetic scattering in many aspects in a delicate and intriguing way. It is shown in [E. Blåsten et al., “On an electromagnetic problem in a corner and its applications”, Anal. PDE (In press)] under a Hölder regularity assumption that the transmission eigenfunctions vanish around a corner. In this paper, we make two novel contributions to this emerging topic. First, we establish the vanishing property under a different regularity criterion in terms of the Herglotz wave approximation which covers more general functions. Second, through extensive numerical experiments, we verify the vanishing property and moreover, we show the transmission eigenfunctions exhibit a certain localising/concentrating phenomenon around the corner, especially in the concave case.

MSC:

78A46 Inverse problems (including inverse scattering) in optics and electromagnetic theory

Cited in 1 Document

35P30 Nonlinear eigenvalue problems and nonlinear spectral theory for PDEs

76M10 Finite element methods applied to problems in fluid mechanics

Keywords:

electromagnetic scattering; Maxwell system; transmission resonance; geometric property; vanishing and localising; Herglotz approximation

Software:

FreeFem++

Full Text: [DOI](#)

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