

Meeting on Modern Aspects of Analysis and Scientific Computing

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Abstract of Talk

SOME SPECTRAL RESULTS FOR WAVEGUIDES

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We study a spectral problem for the Laplacian in a weighted space which is related to the propagation of electromagnetic waves in photonic crystal waveguides. The waveguide is created by introducing a linear defect into a periodic medium. The defect is infinitely extended and aligned with one of the coordinate axes. The perturbation introduces guided mode spectrum inside the band gaps of the fully periodic, unperturbed spectral problem. We use variational arguments to prove that guided mode spectrum can be created by arbitrarily small perturbations. After performing a Floquet decomposition in the axial direction of the waveguide, we study the spectrum created by the perturbation for any fixed value of the quasi-momentum. Time permitting, we will also briefly discuss extending the results to a similar problem for divergence form elliptic operators.