Essential spectra of Maxwell systems and some remarks on analytic pencils

Marco Marletta

We consider how to calculate the essential spectra of time-harmonic dissipative Maxwell systems and Drude-Lorentz pencils. We show how additional unexpected essential spectrum arises at discontinuity interfaces between conductive and non-conductive regions, somewhat related to 'black hole modes? and plasmons observed for second order elliptic equations with sign-changing leading coefficients by several authors. I shall make a case for a particular definition of the $\sigma_{e,5}$ essential spectrum when the problems depend on the spectral parameter in a rather general way. (Hint: it is not the pointwise definition that is natural for the other σ_{ek}.) If time permits I shall also discuss a model of a Faraday layer, for which these ideas turn out to be indispensable.

This talk is based on a series of five papers I have written over the last 6 years with Giovanni Alberti (Genova), Sabine Boegli (Durham), Malcolm Brown (deceased), Francesco Ferraresso (Sassari) and Christiane Tretter.