

Hardy space infinite element method

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We present a new infinite element method for solving Helmholtz-type scattering and resonance problems. Physical solutions are characterised by their Laplace transform in radial direction, which belong to the Hardy space of the negative complex half plane. After another transformation a symmetric variational formulation in the Hardy space of the complex unit disc is derived. Using a Galerkin method with respect to the monomial basis of this Hardy space we obtain super-algebraic convergence. Uniqueness and equivalence to usual characterisations of physical solutions can be proven. In contrast to usual infinite element methods the Hardy space method depends linearly on the square of the wave number. Therefore it can be used for computing resonances in unbounded domains.

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