Boğaziçi
MATH COLLOQUIUM

High frequency asymptotic of the Kirchhoff amplitude for convex obstacles

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Abstract: In this talk, we are concerned with diffraction of waves around a strictly convex obstacle. Our objective is to produce the high frequency asymptotic expansion of the amplitude of the Helmholtz equation solution. The original expansions were obtained using a pseudo-differential decomposition of the Dirichlet to Neumann operator DtN. In our work, we use first and second order approximations of the DtN operator so as to derive new asymptotic expressions of the normal derivative of the total field. The resulting expansions can be used to appropriately choose the ansatz in the design of high-frequency numerical solvers, such as those based on integral equations, in order to produce more accurate approximation of the solutions of the Halmhotz equation around the shadow and the deep shadow regions than the ones based on the usual ansatz.

Joint with: Yassine Boubendir from NJIT, USA.

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