SEMINAR

on

COMPLEX AND HYPERCOMPLEX ANALYSIS

and

INVERSE PROBLEMS IN HEALTH SCIENCES

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On the uniqueness of the Calderón Problem and its application in Electrical Impedance Tomography

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In this talk, we introduce the inverse conductivity problem, also known as Calderón problem and the main novel results to treat complex conductivities. The basis of the results involves tools of complex analysis in the two-dimensional case, and an extension of these methods to three dimensions via quaternionic analysis. The idea is to convert the problem into an analogous one, prove uniqueness here and then revert back to original problem. Due to the non-commutative nature of quaternions, the latter step does not follow as in 2D and a novel strategy based on boundary value operators has been developed to couple both problems together.

Moreover, the main application of the problem is Electrical Impedance Tomography, a medical imaging method, for which we explored an efficient method to compute derivatives of complex computational programs, such as Finite Element Method.

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