



Analysis Seminar

A unified transform approach to analysis of boundary value problems

By

Türker Özsarı (Izmir Institute of Technology)

Abstract: In this talk, we will briefly go over the unified transform method (UTM), also known as the Fokas method, which can be used to construct boundary integral operators for initial boundary value problems (IBVPs). We implement this method in the case of the fourth order Schrödinger equations. Two fundamental ingredients of the UTM are the use of certain invariance maps intrinsic to the given differential operator and a subtle contour deformation. It turns out that one encounters issues related with the analyticity of these invariance maps in the case the given differential operator involves mixed order terms or mixed derivatives. This analyticity issue stems from the use of complex root functions, which are typically discontinuous, to construct invariance maps. We show that the analyticity issues arising from the appearance of square roots can be resolved.

Moreover, we introduce a novel strategy relying on the amenable space time dependence of the associated boundary integral operator to prove Strichartz estimates. These estimates are crucial ingredients to obtain local wellposedness for corresponding nonlinear models with power type source terms when the underlying space is no longer a Banach algebra.

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Date: Tuesday, February 18, 2020

Time: 16:00-17:00

Place: Mathematics Seminar Room, SA – 141

Tea and cookies will be served before the seminar.