TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, April 15th, 2024, 2:30 p.m.

Analysis of a simple model of passive intermodulation

by Eric Stachura

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Abstract: I will discuss a basic model of passive intermodulation (PIM). PIM occurs when multiple signals are active in a passive device that exhibits a nonlinear response. It is known that certain nonlinearities (e.g. the electro-thermal effect) which are fundamental to electromagnetic wave interaction with matter should be accounted for. In this talk, I will discuss existence, uniqueness, and regularity of solutions to a simple model for PIM. This in particular includes a temperature dependent conductivity in Maxwell's equations, which themselves are coupled to a nonlinear heat equation. I will also discuss challenges related to a similar problem when the permittivity ε also depends on temperature. This is joint work with Niklas Wellander and Elena Cherkaev.