Franklin & Marshall College
and
Millersville University

Joint Colloquium in Mathematics

Thursday, October 17th, 2019
4:00 – 5:00PM, Wickersham Room 201, Millersville University

Dr. Satbir Singh Malhi, Franklin & Marshall College

Energy Decay for the linear Damped Klein Gordon Equation on Unbounded Domain

Abstract:
I will present the problem of energy decay for the following damped Klein-Gordon equation.

$$u_{tt} + \gamma(x)u_t - u_{xx} + u = 0. \ (x,t) \in R \times R \tag{1}$$

Where $\gamma(x)u_t$ represents a damping force proportional to the velocity u_t.
A damped Klein-Gordon is a wave whose amplitude of oscillation decreases with time, and eventually goes to zero. I will discuss the long time behaviour of such damped wave equation using semi-group theory. These equations arise from delay and partial differential equations in many disciplines, including physics, chemistry, biology, engineering, and economics. Water waves, sound waves, and simple harmonic motion of strings are some well-known phenomena that are modelled by these equations.

A key ingredient of my method is to study the resolvent operator of the problem through **Fourier** transformation. At the end of my talk, I will present some open problems which will be accessible to undergraduate students.

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