Wave Equations, Local Energy Decay, and Trapping

Collin Kofroth
Launch Point

4/11/2021

1 Abstract

The wave equation is a fundamental partial differential equation modeling the behavior of physical scenarios such as water, sound, and light. The damped wave equation is a variant of the standard wave equation that allows for a friction mechanism. In this talk, we will discuss these equations and their respective energy properties. We will start with energy conservation and local energy decay, the latter of which constitutes a fundamental measure of how waves spread over time. Then, we will add in space-time geometry and explore obstructions to local energy decay. Finally, we will consider the damped wave equation as a means of eliminating one of these obstructions (namely, a geometric feature known as trapping) in lieu of a weaker condition called geometric control.