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Analysis Group Seminar

Friday, September 26, at 2pm in room 340

Speaker: Fumihiko Hirosawa (Yamaguchi University, Japan)

Title: Generalized energy conservation law for wave equations with variable coefficients

Abstract: Smoothness properties of the time dependent propagation speed $a(t)$ of the wave equation

$$u_{tt} - a^2(t)u_{xx} = 0$$

have a crucial effect on the solution. Indeed, if $a(t)$ is not Lipschitz continuous it is possible that solutions lose Sobolev regularity over time and the precise loss corresponds to the nature of the singularities of $a(t)$. Hence, the usual energy estimate can not hold in general. The effect of singular $a(t)$ on the solution has been studied and the mentioned loss of regularity described. The situations is closely related to regular $a(t)$ and the question how fast oscillations of the coefficient can be without destroying uniform / polynomial bounds on the energy.

In this talk we introduce some recent results and basic ideas to derive a benefit from the smoothness of (very) fast oscillating $a(t)$ for the estimate of solutions.