

Applied Mathematics Seminar

Nonexistence of small coherent structures for dispersive equations

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Abstract: For dispersive PDE on spatially periodic domains, we formulate the time-periodic solutions problem as a fixed point problem. The operator in question is the composition of a linear operator and a nonlinear operator. The linear operator can be bounded with small divisor estimates, losing derivatives in the process. If the nonlinear operator can be shown to have smoothing properties, then the composition can be shown to be a local contraction. Thus, the nonexistence of nontrivial small-amplitude doubly periodic waves follows from dispersive smoothing estimates. We demonstrate that the smoothing estimate holds for several equations, including the Korteweg-de Vries equation. Extensions to nonlinear Schrodinger equations and to solitons may be discussed.

Monday, September 15 at 4:00 PM in SEO 636