Functional Analysis, Mathematical Physics, and Dynamical Systems

(FAMPDS)

Joint American-Ukrainian Virtual Colloquium Series

Spring 2021

Talk 14: *Statistical Mechanics, Operator Semigroup Theory, and the Problem of Differentiability in Initial Data for Nonlinear Equations*

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Abstract

Frequently, the development of mathematics is associated with problems emerging in physics, which pose new questions and require a fresh viewpoint at traditional matter. In this talk, we consider an important class of models of statistical physics, the infinite system of particles describing an anharmonic crystal, which furnishes a typical example of an infinite-dimensional nonlinear dynamical system. The infinite dimensionality of the system along with the nonlinearity of the model pose a two-fold complexity to overcome. The natural question on the regular behavior of such a dynamical system gives rise to the problem of the regularity of an operator semigroup, which need not be strongly continuous. The question itself is related to the differentiability with respect to initial data for operator Cauchy problems with unbounded nonlinear operators, which appears to be yet unsolved in its full generality.

Friday, June 11, 10:00-11:00 AM (PDT), 20:00-21:00 (EEST)

Online via Zoom at
https://fresnostate.zoom.us/j/5233106532