FIM Nachdiplomvorlesung

Lawrence C. Evans (University of California, Berkeley)

Weak Convergence Methods for Nonlinear Partial Differential Equations

24 September to 17 December 2019

Tuesdays, 10:15 - 12:00

HG G 43, ETH Zürich, Rämistrasse 101

Abstract

This course will be an ambitious survey of rigorous methods for understanding solutions u^ϵ of various nonlinear PDE in various asymptotic limits. Assuming in particular that the u^ϵ converge *weakly* as $\epsilon \to 0$, we want to identify what PDE the weak limit u solves. This canbe a hugely complicated problem, since the weak convergence is usually incompatible with the nonlinearities; but a rich variety modern techniques can handle these issues for many interesting cases.

The lectures will discuss recent developments concerning (i) asymptotics for ODE, (ii) maximum principle methods, (iii) convexity and monotonicity, (iv) oscillations and compensated compactness, and (v) defect measures, with many examples and applications.

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