DIFTA

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A non-linear degenerate parabolic equation which has "smooth" solutions at positive times even for "non-smooth" initial data.

Abstract: In this talk we provide and analyze a non-linear degenerate parabolic equation in one space dimension where the solution at positive times has bounded second derivatives in x, even if the initial data is only uniformly continuous. This is a surprising phenomenon since in general such equations do not have smooth solutions even for smooth initial data. However, regularizing effects (i.e. the solution at positive times is more regular than the initial data) have been observed in the following subclasses of degenerate parabolic equations:

1. First order Hamilton-Jacobi equation with strctly convex Hamiltonians. (Solutions become Lipschitz and x-semiconcave)

2. Uniformly parabolic equations. (Solutions become continuous differentiable, twice in x and once in t)

But, it seems that this is the first time a regularizing effect producing bounded second-derivatives has been observed and analyzed in an equation that is not uniformly parabolic.