

Very weak solutions of wave equation for Landau Hamiltonian with irregular electromagnetic field

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In this paper, we study the Cauchy problem for the Landau Hamiltonian wave equation, with the time-dependent irregular (distributional) electromagnetic field and similarly irregular velocity. For such equations, we describe the notion of a ‘very weak solution’ adapted to the type of solutions that exist for regular coefficients. The construction is based on considering Friedrichs–type mollifier of the coefficients and corresponding classical solutions, and their quantitative behaviour in the regularising parameter. We show that even for distributional coefficients, the Cauchy problem does have a very weak solution, and that this notion leads to classical or distributional type solutions under conditions when such solutions also exist.