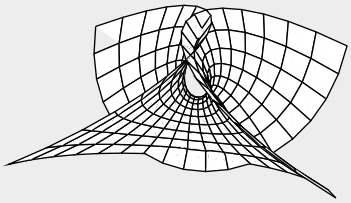

Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

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Landau damping revisited and a road map to the quasilinear approximation

Abstract:

The *quasilinear approximation* is a basic tool in plasma physic. People relate it to Landau Damping with the belief that this technique included in the well known article by Mouhot and Villani (2011) may contribute to a better understanding and more complete proofs.

In Mouhot-Villani (or Cagliotti Maffei) one shows, that if $F(x, v, t)$ is the solution of the Vlasov equation, it converges weakly for $t \to \infty$ to an x independent function $\overline{F}(v)$ and that the difference

$$F(x - vt, v, t) - \overline{F}(v)$$

converges to 0 in $L^\infty(T \times R^d)$. Hence the electric field also converges to 0.

Here instead of letting $t \to 0$ I will consider the problem for a finite time $0 \leq t \leq T < \infty$ and introduce (in agreement with physics) a scaling parameter $\epsilon \to 0$.

Besides observing the presence of *Penrose* instabilities for the linearized problem, the situation leads to new phenomena. In particular it may lead (in this interesting and non trivial case) to a situation where a diffusion type equation is the limit of an Hamiltonian dynamic. - We shall present particlular solutions drived by conveniently chosen extermal the electric fields. Then with spectral or asymptotic analysis one tries to show that this may be also the case for the full non linear problem. - This is joint work in progress with Nicolas Besse and Francois Golse.

Raum 40.03.003 (Mathematikgebäude Ost) | Dienstag, der 28. Jan. 2020 um 13 Uhr

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg