

Time averages for kinetic Fokker-Planck equations

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We consider kinetic Fokker-Planck (or Vlasov-Fokker-Planck) equations on the torus with Maxwellian or fat tail local equilibria. Results based on weak norms have recently been achieved by S. Armstrong and J.-C. Mourrat in case of Maxwellian local equilibria. Using adapted Poincaré and Lions-type inequalities, we develop an explicit and constructive method for estimating the decay rate of time averages of norms of the solutions, which covers various regimes corresponding to subexponential, exponential and superexponential (including Maxwellian) local equilibria. As a consequence, we also derive hypocoercivity estimates, which are compared to similar results obtained by other techniques.

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