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Infinite energy solutions of multi-dimensional Burgers-type equations

We consider the Burgers-type equation

$$u_t + (f(u) \cdot \nabla)u = \nu \Delta u$$

in $\mathbb{R}^n$ with L^∞ (not necessary potential) initial vector field. We show that there is a unique global smooth solution, satisfying the initial condition in a weak sense.