Forced Burgers equation in an unbounded domain. (English summary)

Progress in statistical hydrodynamics (Santa Fe, NM, 2002).

J. Statist. Phys. 113 (2003), no. 5-6, 741–759.

Summary: “The inviscid Burgers equation with random and spatially smooth forcing is considered in the limit when the size of the system tends to infinity. For the one-dimensional problem, it is shown both theoretically and numerically that many of the features of the space-periodic case carry over to infinite domains as intermediate time asymptotics. In particular, for large time $T$ we introduce the concept of $T$-global shocks replacing the notion of main shock which was considered earlier in the periodic case [E. Weinan et al., Phys. Rev. Lett. 78 (1997), no. 10, 1904–1907]. In the case of spatially extended systems these objects are no longer global. They can be defined only for a given time scale and their spatial density behaves as $\rho(T) \sim T^{-2/3}$ for large $T$. The probability density function $p(A)$ of the age $A$ of shocks behaves asymptotically as $A^{-5/3}$. We also suggest a simple statistical model for the dynamics and interaction of shocks and discuss an analogy with the problem of distribution of instability islands for a simple first-order stochastic differential equation.”

References


Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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