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Nota di contenuto	Shock waves and the large scale structure (LSS) of the universe -- Hydrodynamic limits, nonlinear diffusions, and propagation of chaos -- Hopf-Cole formula and its asymptotic analysis -- Statistical description, parabolic approximation -- Hyperbolic approximation and inviscid limit -- Forced Burgers turbulence -- Passive tracer transport in Burgers' and related flows -- Fractal Burgers-KPZ models.
Sommario/riassunto	These lecture notes are woven around the subject of Burgers' turbulence/KPZ model of interface growth, a study of the nonlinear parabolic equation with random initial data. The analysis is conducted mostly in the space-time domain, with less attention paid to the frequency-domain picture. However, the bibliography contains a more complete information about other directions in the field which over the last decade enjoyed a vigorous expansion. The notes are addressed to a diverse audience, including mathematicians, statisticians, physicists, fluid dynamicists and engineers, and contain both rigorous and heuristic arguments. Because of the multidisciplinary audience, the notes also include a concise exposition of some classical topics in probability theory, such as Brownian motion, Wiener polynomial chaos, etc.