

Gutkin, Eugene

Propagation of chaos and the Hopf-Cole transformation. (English) Zbl 0606.35041
Adv. Appl. Math. 6, 413-421 (1985).

In a previous paper it has been shown that Burgers' equation constitutes a limit of a contracted N-body problem when N tends to infinity. By proving that the L-operator may be transformed into a Laplacian Δ , by using an intertwining operator Q, an unsuccessful attempt was made to obtain a linearizing transformation for the Burgers equation in order to achieve a Hopf-Cole transformation.

In this paper the difficulties encountered previously were by-passed and a transformation closely related to the Hopf-Cole transformation was established. The transformation may be used to define the nonlinear evolution equations, which can be obtained by contraction from N-body linear problems, and distinguish the nonlinear equations which can be linearized by using the approximate approach established in this paper.

Reviewer: [P.Theocaris](#)

MSC:

- [35K55](#) Nonlinear parabolic equations
- [35A30](#) Geometric theory, characteristics, transformations in context of PDEs
- [37D45](#) Strange attractors, chaotic dynamics of systems with hyperbolic behavior
- [35Q99](#) Partial differential equations of mathematical physics and other areas of application

Cited in **2** Documents

Keywords:

[propagation of chaos](#); [linearizing transformation](#); [Hopf-Cole transformation](#); [nonlinear evolution equations](#); [contraction](#); [N-body linear problems](#); [approximate approach](#)

Full Text: [DOI](#)

References:

- [1] Cole, J.D, On a quasilinear parabolic equation occurring in aerodynamics, Quart. appl. math., 9, 225-236, (1951) · [Zbl 0043.09902](#)
- [2] Gutkin, E; Kac, M, Propagation of chaos and the Burgers equation, SIAM J. appl. math., 43, 971-980, (1983) · [Zbl 0554.35104](#)
- [3] Hopf, E, The partial differential equation $\textit{u} + uux = \mu xx$, Comm. pure appl. math., 3, 201-230, (1950)
- [4] McKean, H.P, Propagation of chaos for a class of nonlinear parabolic equations, (), 177-194
- [5] [E. Gutkin](#), Quantum nonlinear Schrödinger equation. I. Intertwining operators, $\textit{Ann. Inst. Henri Poincaré}$, to appear. · [Zbl 0614.35086](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.