Fixed points for planar maps with multiple twists, with application to nonlinear equations with indefinite weight

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Talk Abstract

We investigate the dynamical properties of planar maps which can be represented as a composition of twist maps together with expansive–contractive homeomorphisms. These maps present some common features both with those arising in the context of the Poincaré–Birkhoff theorem and those studied in the theory of topological horseshoes. We show that the multiplicity results of fixed points and periodic points typical of the Poincaré–Birkhoff theorem can be recovered and improved in our setting. Applications are given to periodic solutions for planar systems of non-autonomous ODEs with sign-indefinite weights. The presence of complex dynamics is also discussed.

Keywords: Twist maps, Poincaré-Birkhoff theorem, expansive-contractive directions, topological horseshoes, indefinite weight.

References

[1] Margheri, A., Rebelo, C., Zanolin, F., Fixed points for planar maps with multiple twists, with application to nonlinear equations with indefinite weight, *Philosophical Transactions of the Royal Mathematical Society A*, 379, 2021, 28 pp.