Advances in
MATHEMATICAL
ECONOMICS
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On the Fourier analysis approach to the Hopf bifurcation theorem

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Abstract. Ambrosetti and Prodi (A primer of nonlinear analysis, Cambridge University Press, Cambridge, 1993) formulated an abstract version of the Hopf bifurcation theorem and tried to deduce the well-known classical result from it. In this paper, we examine the Hopf bifurcation phenomena in the framework of a Sobolev space (rather than C^r), having recourse to the Carleson–Hunt theory. Some more careful reasonings to evaluate the magnitudes of the Fourier coefficients seem to be required in order to implement the Ambrosetti–Prodi approach in their classical setting. We incidentally try to fortify their way of proof from the standpoint of classical Fourier analysis.

Key words: Hopf bifurcation, periodic solution for ordinary differential equation, Fourier series

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