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A new proof of the infinite-dimensional Gale-Nikaido-Debreu lemma. (Chinese)

[Zbl 0957.91063](#)

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This paper studies the infinite-dimensional Gale-Nikaido-Debreu lemma introduced by *N. C. Yannelis* [*J. Math. Anal. Appl.* 108, 595-599 (1985; [Zbl 0581.90010](#))]. Yannelis proves his version of the lemma by Tikhonov's fixed point theorem, while the author provides a new proof using the minimax inequality [*Ky Fan*, in 'Inequalities III', Proc. 3rd Symp., Los Angeles 1969, 103-113 (1972; [Zbl 0302.49019](#))] and the minimax theorem [*M. Sion*, *Pac. J. Math.* 8, 171-176 (1958; [Zbl 0081.11502](#))]. The Gale-Nikaido-Debreu lemma is an important tool in proving the existence of market equilibria [for surveys, *A. Mas-Colell* and *W. R. Zame*, in 'Handbook of mathematical economics', Vol. IV, 1835-1898 (1991; [Zbl 0908.90036](#))]. The author's result suggests that the existence of market equilibria could be established by the minimax inequality and minimax theorem, it is therefore a useful contribution to mathematical economics.

Reviewer: [J.Zhao](#) (Columbus/Ohio)

MSC:

[91B50](#) General equilibrium theory

[54H25](#) Fixed-point and coincidence theorems (topological aspects)

Keywords:

infinite-dimensional Gale-Nikaido-Debreu lemma; fixed point theorem; minimax inequality; minimax theorem; existence of market equilibria