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Testability of evolutionary game dynamics based on experimental economics data¹ YIJIA WANG, XIAOJIE CHEN, School of Mathematical Sciences, University of Electronic Science and Technology of China, ZHIJIAN WANG, Experimental Social Science Laboratory, Zhejiang University — In order to better understand the dynamic processes of a real game system, we need an appropriate dynamics model, so to evaluate the validity of a model is not a trivial task. Here, we demonstrate an approach, considering the dynamical macroscopic patterns of angular momentum and speed as the measurement variables, to evaluate the validity of various dynamics models. Using the data in real time Rock-Paper-Scissors (RPS) games experiments, we obtain the experimental dynamic patterns, and then derive the related theoretical dynamic patterns from a series of typical dynamics models respectively. By testing the goodness-of-fit between the experimental and theoretical patterns, the validity of the models can be evaluated. One of the results in our study case is that, among all the nonparametric models tested, the best-known Replicator dynamics model performs almost worst, while the Projection dynamics model performs best. Besides providing new empirical macroscopic patterns of social dynamics, we demonstrate that the approach can be an effective and rigorous tool to test game dynamics models.

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