

Justifiable equilibrium *

Anna Zseleva

Tel Aviv University

We present a general existence result for a type of equilibrium in normal-form games. We consider nonzero-sum normal-form games with an arbitrary number of players and arbitrary action spaces. We impose merely one condition: the payoff function of each player is bounded. We allow players to use finitely additive probability measures as mixed strategies.

Since we do not assume any measurability conditions, for a given strategy profile the expected payoff is generally not uniquely defined, and integration theory only provides an upper bound, the upper integral, and a lower bound, the lower integral. A strategy profile is called a justifiable equilibrium if each player evaluates this profile by the upper integral, and each player evaluates all his possible deviations by the lower integral. We show that a justifiable equilibrium always exists.

Our equilibrium concept and existence result are motivated by Vasquez (2017), who defines a conceptually related equilibrium notion, and shows its existence under the conditions of finitely many players, separable metric action spaces and bounded Borel measurable payoff functions. Our proof borrows several ideas from Vasquez (2017), but is more direct as it does not make use of countably additive representations of finitely additive measures by Yosida and Hewitt (1952).

*Based on joint work with János Flesch and Dries Vermeulen.