

# A new epistemic model

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## Abstract

Meier (2012) gave a "mathematical logic foundation" of the purely measurable universal type space (Heifetz and Samet, 1998). The mathematical logic foundation, however, discloses an inconsistency in the type space literature: a finitary language is used for the belief hierarchies and an infinitary language is used for the beliefs.

In this paper we propose an epistemic model to fix the inconsistency above. We show that in this new model the universal knowledge-belief space exists, is complete and encompasses all belief hierarchies.

Moreover, by examples we demonstrate that in this model the players can agree to disagree – Aumann (1976)'s result does not hold –, and Aumann and Brandenburger (1995)'s conditions are not sufficient for Nash equilibrium. However, we show that if we substitute self-evidence (Osborne and Rubinstein, 1994) for common knowledge in both papers above, then we get that both Aumann (1976)'s and Aumann and Brandenburger (1995)'s results hold.

**Keywords:** Incomplete information game, Agreeing to disagree, Nash equilibrium, Epistemic game theory, Knowledge-belief space, Belief hierarchy, Common knowledge, Self-evidence

**JEL Codes:** C70; C72; D80; D82; D83

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