

Reasoning about Bounded Reasoning

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Abstract :

A recurring challenge in experimental applications of level-k models is that estimated type distributions vary widely across environments. We argue that this reflects two distinct channels that existing frameworks do not separate. One is belief-driven bounded reasoning, where players believe opponents are of lower types. The other is limited depth of higher-order reasoning about rationality. We develop a unified framework that makes this distinction explicit by lifting static complete-information games into incomplete-information settings where players are uncertain about opponents' types. In this framework, belief-driven bounded reasoning appears are captured via first-order belief restrictions, while limits in higher-order reasoning appear as bounds on belief in rationality. To show the flexibility and tractability of our framework, we analyze three special cases, *\emph{downward rationalizability}*, *\emph{L-rationalizability}*, and *\emph{CH-rationalizability}*. Among other things, these provide reasoning-based foundations, with an important nuance, for level-k and Cognitive Hierarchy models, a robust solution concept generalizing both, and clarify what observed level-k behavior can identify about underlying reasoning.