ON THE EXISTENCE OF EQUILIBRIA IN A CLASS OF BAYESIAN ALLOCATION-MECHANISMS

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ABSTRACT. We study the question of equilibrium-existence in the following class of N-player Bayesian games. Each player $n \in \{1, ..., N\}$ has a general type space Ω_n, and there's a prior p on $\Omega = \prod_{n=1}^{N} \Omega_n$ that is absolutely continuous with respect to the product of its marginals. The action space A_n of player n is compact Hausdorff. The outcome space, denoted $\Delta(Z)$, is the set of probability distributions over a finite set Z. The outcome function is given by $\lambda : A \to \Delta(Z)$, where $A = \prod_{n=1}^{N} A_n$. Transfers are denoted by t_n and payoffs by $u_n : \Omega \times Z \times \mathbb{R} \to \mathbb{R}$, so $u_n(\omega, z, t_n)$ is the payoff to n when the type profile is ω, the outcome is z and the payment he makes is t_n. We assume that the game is "mildly discontinuous" in the sense that λ is continuous almost everywhere. The model subsumes standard auction models. We provide sufficient conditions for the existence of Nash equilibria in mixed strategies as well as in pure strategies, and also ε-Nash equilibria in these games and explore the implications of these results for auctions.

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