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Anonymous Pricing for Non-linear Agents

The optimal single-item auction for agents with independent but non-identically distributed values is complex for linear utility agents (Myerson, 1981) and has no closed-form characterization for non-linear agents (Alaei et al., 2012). For linear utility agents satisfying a natural regularity property, Alaei et al. (2018) showed that posting an anonymous price is an ϵ -approximation. We give a parameterized regularity property for non-linear agents and show that the approximation bound of anonymous pricing for regular agents approximately extends to agents that satisfy this approximate regularity property. We apply this approximation framework to agents with public-budget utility, private-budget utility, and risk-averse utility.