Abstract:

Many sales, sports, and research contests are put in place to maximize contestants' performance. We investigate and provide a complete characterization of the prize structures that achieve this objective in settings with many contestants. The contestants may be ex-ante asymmetric in their abilities and prize valuations, and there may be complete or incomplete information about these parameters. The contestants may be risk neutral, risk averse, or risk seeking, and their performance cost may be linear, concave, or convex. A main novel takeaway is that awarding numerous different prizes whose values gradually decline with contestants' ranking is optimal in the typical case of risk averse contestants that have a convex cost of performance. This suggests that many existing contests can be improved by increasing the number of prizes and making them more heterogeneous. Our analysis also uncovers a novel connection between performance-maximizing large contests and Myerson's (1981) optimal auction with a single buyer. The techniques we develop can also be used to formulate and solve other contest design questions that have so far proven intractable.